I Year II Semester   **L   P   C**

Code: 17CS254   **4   0   3**

MACHINE LEARNING
(Elective–1)

UNIT-I: The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the work horses of machine learning. **Binary classification and related tasks:** Classification, Scoring and ranking, Class probability estimation

UNIT- II: Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. **Concept learning**: The hypothesis space, Paths through the hypothesis space, beyond conjunctive concepts

UNIT- III: Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. **Rule models:** Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT -IV: Linear models: The least-squares method, The perception: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, going beyond linearity with kernel methods. **Distance Based Models:** Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

UNIT-V: Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimizing conditional like lihood Probabilistic models with hidden variables. **Features:** Kinds of feature, Feature transformations, Feature Construction and selection. **Model ensembles:** Bagging and random forests, Boosting

TEXTBOOKS:
Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.

Machine Learning, TomM. Mitchell, MGH.

REFERENCEBOOKS:
1. Understanding Machine Learning: From Theory to Algorithms, ShaiShalev-Shwartz, Shai Ben-David, Cambridge.
2. Machine Learningin Action, PeterHarington, 2012, Cengage.