	Course Title: Machine Learning		
	Course Code:18CS62	**No. of Credits: 4 : 0 : 0 (L-T-P)**	**No. of lecture hours/week : 4**
	Exam Duration : 3 hours	**CIE+ Assignment + SEE = 45+5+50=100**	**Total No. of Contact Hours : 52**

Course Objectives:	**Description**
	1. Understand some basic machine learning algorithms and techniques and their applications. **2.** Able to analyze the underlying mathematical relationships among Machine Learning algorithms. **3.** Able to identify, formulate and solve machine learning problems that arise in practical applications.

Unit No	**Syllabus Content**	**No of Hours**
1	**Introduction:** Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning. Machine Learning Unit 1 Notes **Concept Learning:** Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias. Text Book1, Sections: 1.1 – 1.3, 2.1-2.5, 2.7	**10 hours**
2	**Decision Tree Learning:** Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning. Text Book1, Sections: 3.1-3.7 Machine Learning Unit 2 Notes	**10 hours**
3	**Artificial Neural Networks:** Fundamental Concepts, Evolution of Neural Network, Basic Model of ANN, important terminologies of ANN, McCulloch-Pitts Neuron, Linear Separability, Hebb Network, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network, Radial Basis function network. ML-Unit-3 Neural Networks Untill Perceptron Netwrorks the above pdf , rest three concepts have to see from utube and learn Text book 2, Sections: 2.1 – 2.7,3.1-3.3,3.5,3.6	**12 hours**
4	**Bayesian Learning:** Machine Learning Unit 3 Notes	**10 hours**

	Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, ML for predicting probabilities, MDL principle, Naive Bayes classifier, Bayesian belief networks, EM algorithm Text book 1, Sections: 6.1 – 6.6, 6.9, 6.11, 6.12	
5	**Self Study** **Evaluating Hypothesis:** Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms. Machine Learning Unit 5 Notes **Instance Based Learning:** Introduction, k-nearest neighbor learning, locally weighted regression, radial basis function, cased-based reasoning, Text book 1, Sections: 5.1-5.6, 8.1-8.5	**10 hours**

Course Outcomes	**Description**	**RBT Levels**
At the End of the Course, the students should be able to		
CO1	Acquire knowledge about basic concepts of Machine Learning.	**L2**
CO2	Identify and apply machine learning techniques suitable for a given problem	**L3**
CO3	Design and implement machine learning solutions to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.	**L4**
CO4	Evaluate and interpret the results of the machine learning algorithms.	**L5**

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**P06**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**3**	**2**			**2**							
CO2	**3**	**3**	**2**		**2**							
CO3	**3**	**3**	**3**	**3**	**3**							
CO4	**3**	**3**		**3**	**3**							

Strong -3 Medium -2 Weak -1

TEXT BOOKS:

1. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.
2. S N Sivanandam, S N Deepa, Principles of Soft Computing,3rd Edition, Wiley Publication,2019.

REFERENCE BOOKS:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, h The Elements of Statistical Learning, 2nd edition, springer series in statistics.
2. Ethem Alpaydın, Introduction to machine learning, second edition, MIT press.
3. Samir Madhavan ,Mastering python for data science, 2015, Packt Publishing, ISBN: 9781784390150
4. Sebastian Raschka, Vahid Mirjalili,Python Machine Learning - Second Edition: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow Kindle Edition.

WEBLINKS:

1. https://towardsdatascience.com/real-world-implementation-of-logistic-regression-5136cefb8125
2. https://towardsdatascience.com/linear-regression-python-implementation-ae0d95348ac4
3. https://towardsdatascience.com/decision-tree-in-machine-learning-e380942a4c96
4. https://towardsdatascience.com/basics-of-bayesian-network-79435e11ae7b
5. https://towardsdatascience.com/introduction-to-artificial-neural-networks-ann-1aea15775ef9

COURSE COORDINATOR:	**Dr. K R Shylaja** **Mrs. Asha K N**