

Subject Code: 1ET4040603	Subject Title: Machine Learning
Pre-Requisite	Knowledge of Statistics, Linear Algebra, Calculus, Probability

RATIONALE:

COURSE OBJECTIVE:

1. Understanding of the basic concepts in machine learning
2. Deeper mathematical understanding of the foundations of machine learning methods
3. Skills in using popular tools, libraries and software for problem solving
4. Hands on experience in solving problems that may be encountered in the industry
5. Introductory understanding and exposure to selected research topics in Machine Learning

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
3	-	2	4	60	40	20	30

DETAILS OF COURSE CONTENTS:

Sr. NO.	TOPIC	Total Hrs.	Weightage
1	Artificial Neural Network 1.1.What is Artificial Intelligence 1.2.Types of Neural Network 1.3.ANN 1.4.ANN architectures - Feed forward - Acyclic - Fully connected - Layered	10	24%
2	Introduction to Machine Learning 2.1 What is machine learning? 2.2 Why machine learning is used? 2.3 When ML is used?	08	19%
3	Machine Learning Systems 3.1 Supervised Learning 3.2 Un-Supervised Learning 3.3 Semi-Supervised Learning 3.4 Reinforced Learning	06	14%
4	Regression 4.1 What is Regression 4.2 Types - Linear - Non linear	08	19%

5	Classification 5.1 What is classification 5.2 Types of classification - Binary - Multi-class 5.3 K-Nearest Neighbour 5.4 Support Vector Machine	10	24%
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COURSE OUTCOME:

1. Basic knowledge about Artificial Neural Network.
2. Brief Knowledge about what is machine learning.
3. To know about machine learning algorithms and classifiers.
4. Knowledge about Python packages suitable for machine learning.

LIST OF PRACTICAL:

SR. No.	Experiment
1	Write programs for Vectors, Matrices, and Arrays to perform below operations. • Creating a Vector • Creating a Matrix • Creating a Sparse Matrix • Selecting Elements • Describing a Matrix • Applying Operations to Elements • Finding the Maximum and Minimum Values • Calculating the Average, Variance, and Standard Deviation • Reshaping Arrays • Transposing a Vector or Matrix • Flattening a Matrix • Calculating the Determinant • Adding and Subtracting Matrices • Multiplying Matrices • Inverting a Matrix • Generating Random Values
2	Write programs to Load below data sets. • Loading a Sample Dataset • Creating a Simulated Dataset • Loading a CSV File • Loading an Excel File • Loading a JSON File • Querying a SQL Database
3	Write programs to perform following manipulations on data. • Creating a Data Frame • Describing the Data • Navigating DataFrames • Selecting Rows Based on Conditionals • Replacing Values

	• Renaming Columns • Finding the Minimum, Maximum, Sum, Average, and Count • Finding Unique Values • Handling Missing Values • Deleting a Column • Deleting a Row • Dropping Duplicate Rows • Grouping Rows by Values • Grouping Rows by Time • Looping Over a Column • Applying a Function Over All Elements in a Column • Applying a Function to Groups • Concatenating DataFrames • Merging DataFrames
4	Write programs for Text Handling using the following operations. • Cleaning • Text Parsing and Cleaning HTML • Removing Punctuation • Tokenizing Text • Removing Stop Words • Stemming Words • Tagging Parts of Speech • Encoding Text as a Bag of Words
5	Write programs to perform below Image manipulations. • Loading Images • Saving Images • Resizing Images • Cropping Images
6	Case Study about MINST data set and Classifier technique to get more than 90% accuracy

LIST OF REFERENCES:

Sr.no.	Title	Author	Publication
1	Machine Learning_ Step-by-Step Guide To Implement Machine Learning Algorithms with Python.	Rudolph Russell	Rudolph Russell Publications
2	Machine Learning with Python Cookbook_ Practical Solutions from Preprocessing to Deep Learning.	Chris Albon	O'Reilly Media, Inc.

LINK OF LEARNING WEB RESOURCE:

1	https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_neural_networks.html
2	https://towardsdatascience.com/introduction-to-artificial-neural-networks-ann-1aea15775ef9