

Subject Code: 2ET4040603	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 ANN architectures - Feed forward - Feed Back - Fully connected 1.4. Types of AI Agents 1.5 Applications of AI	08	19%
2	Introduction to Machine Learning What is machine learning? Why machine learning is used? When ML is used? Machine Learning Systems Supervised Learning Un-Supervised Learning Semi-Supervised Learning Reinforced Learning	10	24%
3	Numpy - Creating Array: array() - Accessing Array: by referring to its index number - Stacking & Splitting: stack(), array_split() - Maths Functions: add(), subtract(), multiply(), divide(),	08	19%

	power(), mod() - Statistics Functions: amin(), amax(), mean(), median(), std(), var(), average(), ptp() Pandas - Series: Series() - Dataframes: DataFrames() - Read CSV File: read_csv() - Cleaning Empty Cells: dropna() - Cleaning Wrong Data: drop() - Removing Duplicates: duplicated() - Pandas Plotting: plot()		
4	Regression What is Regression Types - Linear - Non linear	06	14%
5	Classification What is classification Types of classification - Binary - Multi-class K-Nearest Neighbour Support Vector Machine	10	24%

LIST OF PRACTICAL:

SR. No.	Experiment
1	Explore any Machine learning tool.
2	Write a NumPy program to implement following operation 2.1 to convert a list of numeric values into a one-dimensional NumPy array 2.2 to create a 3x3 matrix with values ranging from 2 to 10 2.3 to append values at the end of an array
3	Write a NumPy program to implement following operation 3.1 to split an array of 14 elements into 3 arrays, each with 2, 4, and 8 elements in the original order 3.2 to stack arrays horizontally (column wise)
4	Write a NumPy program to implement following operation 4.1 to add, subtract, multiply, divide arguments element-wise 4.2 to round elements of the array to the nearest integer
5	Write a NumPy program to implement following operation 5.1 to find the maximum and minimum value of a given flattened array 5.2 to compute the mean, standard deviation, and variance of a given array along the second axis
6	Write a Pandas program to implement following operation 6.1 to convert a NumPy array to a Pandas series 6.2 to convert the first column of a DataFrame as a Series 6.3 to sort a given Series
7	Write a Pandas program to implement following operation 7.1 to create a dataframe from a dictionary and display it 7.2 to sort the DataFrame first by 'name' in ascending order 7.3 to delete the one specific column from the DataFrame
8	Write a Pandas program to implement following operation to find and drop the missing values from the given dataset
9	Write a Pandas program to implement following operation to remove the duplicates from the given dataset
10	Write a Pandas program to implement following operation to create the mean and standard deviation of the data of a given Series

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

COURSE LEARNING 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.

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	H	M		M								L			
CLO2	H	M	M		M								L			
CLO3	H	M	M	M	M								L			
CLO4	H	M														
CLO5	M	M	M	M												

H: High, M: Medium, L: Low