GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 5th Semester
Branch: Information Technology
Subject Name: Machine Learning
Subject Code: 1150504

Type of subject: Core

Prerequisite: Python Programming

Rationale: Machine learning focuses on the use of data and algorithms to perform learning. To solve analytical problems in Computer domain it is important to understand the need of machine learning and apply machine learning methods in efficient ways.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C Credit; ESE- End Semester Examination; PA- Progressive Assessment

Course Details:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Introduction to Machine Learning :** What is Machine Learning, Types of Machine Learning(Supervised, Unsupervised, Reinforcement), Life Cycle of Machine Learning, Application of Machine Learning, Installation and configuration of python libraries used in machine learning (Numpy, Matplotlib, Pandas)	08	20
2	**Introduction to Python Libraries used in Machine Learning :** Working with Numpy Library (Working with an Array, Creating an Array, Accessing an Array ,Stacking and Splitting an Array), Working with Matplotlib Library (Pyplot.plot: plot(), Show: show(), Labels: xlabel(), ylabel(), Grid: grid(), Bars: bar(), Subplot: subplot(), pie chart: pie()	08	15
3	**Working with Python Library to work with Data Set in Machine Learning.** Analyzing Data Using Pandas as per following function. Series: Various operations using series() function. Dataframes: Various operations using DataFrames() function. Read CSV File: read_csv(), Cleaning Empty Cells: dropna(), Cleaning Wrong Data: drop(), Removing Duplicates: duplicated()**),** Working with Sklearn Library (Introduction to	09	20

	Sklearn, Key Features of Sklearn, Loading Data Set, Splitting and Testing Data Set)		
4	**Introduction to Data Analysis, Data Remediation and Data Pre-processing :** What is Data Analysis, Types of Data Analysis Methods, Data Analysis Process, Data Analysis Tools, Data Remediation, Data Pre-processing	07	20
5	**Supervised and Unsupervised Machine Learning** What is Supervised Machine Learning, Types of Supervised Learning Models: Classification (KNN algorithm, Decision Tree), Regression. What is Unsupervised Machine Learning, Clustering: (Concepts of Clustering, Application of Clustering, K-means clustering algorithm), Association: (Concepts of Association, Application of Association), Difference between Supervised Vs. Unsupervised learning.	10	25
	TOTAL	**42**	**100**

Suggested Specification Table with Marks (Theory): (For B.VOC. Only)

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
5	20	15	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO Statement	Weightage (%)
CO-1	To understand the basic concepts of machine learning and its type. Also learners can understand how to set up and configure the python libraries.	**20**
CO-2	Apply python Numpy and Matplotliblibrary's functions to work with data setssuch asarrays, series, csv files.	**15**
CO-3	Perform data Wrangling with Scikit-learn and Pandas for applying exploratory data analysis and outcomes.	**20**
CO-4	Demonstrating skills in data preprocessing, like handling missing values, encoding categorical variables, to predicting the outcomes.	**20**
CO-5	Understanding of supervised and unsupervised learning basic concepts to learn how students can work with labeled and unlabeled data set.	**25**

Suggested Case Study:

1. Prepare case study on stock market prediction by using python libraries like matplotlib, pandas, scikit.
2. Implement case study on salary prediction of employees using python libraries like matplotlib, pandas, scikit.
3. Case study on sales prediction using python libraries.
4. Case study on crop yield prediction using the concepts of machine learning.

Reference Books:

1. Machine Learning by Saikat Dull, S. Chandramouli.
2. Machine Learning Using Python by Pradhan Manaranjan, U Dinesh Kumar.
3. Introduction to Machine Learning by Jeeva Jose
4. Machine Learning_ Step-by-Step Guide To Implement Machine Learning Algorithms with Python by Rudolph Russell

Web Resources: -

1. https://www.geeksforgeeks.org/machine-learning/
2. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
3. https://www.javatpoint.com/machine-learning
4. https://nptel.ac.in/
5. https://www.coursera.org/
6. https://scikit-learn.org/
7. https://www.w3resource.com/python-exercises/pandas/index.php
8. https://machinelearningforkids.co.uk/
9. https://monkeylearn.com/machine-learning/
10. http://appinventor.mit.edu/explore/ai-with-mit-app-inventor