GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Semester: V
Subject Name: Python Programming
Subject Code: 3154206

Prerequisite: Data Structures
Rationale: Python is a next-generation, general-purpose programming language that enables its users to construct applications for a wide variety of different industries. Students will be able to get an understanding of the core concepts of programming in Python, as well as the potential of Python to meet the requirements of modern computing.

Objectives:
1. Understand the working principle of python
2. Understand various data types and programming constructs of python
3. Understand and apply the concept in Machine Learning

Sr.	Description	Total Hrs.	Weightage (%)
1	**Basics of Python:** Python Installation, Python editors, variables and data types, Operators	04	10
2	**String:** String representation, String Operations, Indexing and slicing, Formatting Strings, other string operations **Lists:** Creating Lists, Basic List Indexing and slicing, Built-In Functions Used on Lists, List Methods	06	20
3	**Dictionaries:** Creating Dictionary, Accessing and Modifying key, value Pairs in Dictionaries, Built-In Functions used on Dictionaries, Dictionary Methods **Tuples and Sets:** Creating Tuples, Indexing and slicing, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip () Function, Sets: Creating and accessing set, Operations on set	06	20
4	**Control Flow Statements:** if, if-else, if-elif-else, Nested if statement, while loop, for loop, continue and break statements	04	10
5	**Files:** Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files	04	10
6	**Introduction to Data science:** Explore following libraries NumPy: Creating, accessing, manipulating array, performing various operations on array. Pandas: Functions to create, access and manipulate sequence and data frame from file Matplotlib: Line Graphs, Scatter Graph, Pie Charts, Bar Charts, Figures and Subplot Scikitlearn: Linear regression, K-Nearest neighbour classifier, Logistic regression, Decision Tree, Random forest classifier Clustering and anomaly detection	12	30

Reference books:

1. Introduction to Machine Learning with Python, A.C.Muller, S. Guido, O'Reilly
2. Starting Out with Python, Tonny Gaddis, Pearson
3. Hands-On Machine Learning with Scikit-Learn & TensorFlow, Aurélien Géron, O'Reilly
4. Beginning Pyhton, Peter Norton, Alex Samuel, Wrox Publication
5. Python Algorithms, Magnus Liet Hetland, Apress
6. Introduction to Python Programming. Gowrishankar S, Veena A CRC Press/Taylor & Francis
7. Programming in Python 3: A Complete Introduction to the Python Language, Mark Summerfield, Pearson Education
8. Advanced Guide to Python 3 Programming, John Hunt, Springer

Course Outcomes:

1. Understand various sequences such as string, list, tuple, set and dictionary
2. Understand various control flow statements
3. Understand data using various visualization technique
4. Apply the knowledge of python in machine learning

List of practical:

1. Installation of python, be familiar with python editor and WAP to print ‘Hello World’
2. WAP to demonstrate the use of various type of operators in python
3. WAP to understand use of sequences such as string, tuple, list, dictionary and set
4. WAP to sort the given data using any sorting technique
5. WAP to print sum of prime numbers in given list
6. WAP
7. Read Iris data set and understand the distribution of data with different plots
8. WAP to read csv file (Wisconsin Breas Cancer Dataset) and perform exploratory data analysis on it
9. WAP to classify the flower species from Iris dataset using supervised machine learning model
10. WAP to perform clustering on Iris flower dataset