COURSE TITLE	**PROGRAMMING WITH PYTHON**
COURSE CODE	**01CT1309**
COURSE CREDITS	**2**

Objective:

1. To describe the core syntax and semantics of Python programming language
2. To discover the need for working with the strings and functions.
3. To illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
4. To infer the Object-oriented Programming concepts in Python.
5. To develop the ability to write GUI and database applications in Python.
6. To explore NumPy, pandas and matplotlib python libraries.
7. The objective of this course is to describe the core syntax and semantics of Python programming language and make student understand the need for working with the strings and functions. Further, this course will include Object-oriented Programming concepts and develop the ability to write GUI and database applications in Python using NumPy, pandas and matplotlib python libraries
8. The objective of this course is to describe the core syntax and semantics of Python programming language and make student understand the need for working with the strings and functions. Further, this course will include Object-oriented Programming concepts and develop the ability to write GUI and database applications in Python using NumPy, pandas and matplotlib python libraries.

Course Outcomes: After completion of this course, student will be able to:

1. Understand flowcharts and algorithms that help to develop a creating a logical foundation for any real problem. (Understand)
2. Understand how to use various data structures, modules, primitive datatypes, and user-defined datatypes. (Understand)
3. Analyse how various control flow statements (such as iterative, transfer, and conditional statements) are used in a complex problem. (Analyse)
4. Apply the knowledge of decisional control statements to deal with pre-processors, functions, modules, and file handling to enhance coding skills. (Apply)
5. Create a model for data analysis using NumPy, pandas, and matplotlib. (Create)

Pre-requisite of course: Basic knowledge of programming, Object oriented concept.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	0	0	50	50

Contents : Unit	Topics	Contact Hours

MR. CHANDRASINH DHIRUBHA PARMAR
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Total Hours	

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiments** To write python code for different number datatypes , To write python code to perform different arithmetic operations on numbers, To write python code to perform string operations. To write python code to print current Date format, To write python code to create, append, remove list and control structures. , To write python code to demonstrate working with tuples, To write python code to demonstrate working with dictionaries, To write python code to find largest from three numbers. To write python code to convert temperature from Celsius to Fahrenheit. To write python code to print prime numbers from given number, To write python code to find factorial of a number using recursion. To write python code for triangle (length of three sides). To write python code for to find right angle triangle (Using Pythagorean theorem), To write python code to define a module to find Fibonacci numbers and import the module to another code. To write python code to define a module and import a specific function in that module to another code. , To write python code to call data and function using classes and objects. To write python code to read subject marks and display result of students , To write python code for validation of user data (Email, Mobile no, Aadhar card), To write python code for GUI, To write python code for file handling (text file), To write python code take input as text file and print all unique words in the file in alphabetical order, To write python code for GUI (Student Data Entry: - Roll No, Student Record, Percentage), To write micro python code for LED Blinking on ESP32 board, To write micro python code for Switch through LED Blinking on ESP32 board, To write micro python code for sensor data update on ESP32 board, Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first the second file , Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order, Practical based on NumPy ndarray, Practical based on Pandas Data Structures, Practical based on Data Loading, storage and file formats, Practical based on Interacting with Web APIs, Simulate continuous time elementary signals , Simulate basic operations on continuous time elementary signals , Simulate discrete time elementary sequence , Simulate sampling on continuous time signals and generate frequency spectrums of signal before and after sampling, Simulate a program to analyze discrete time LTI system	56
2	**Experiment 1** Write a program to demonstrate different number datatypes in python. Write a program to perform different arithmetic operations on numbers in python.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
3	**Experiment 2** Write a program to create, concatenate and print a string and accessing substring from a given string. Write a python script to print the current date in following format “Sun August 01 10:10:10 IST 2021”	2
4	**Experiment 3** Write a python program to create, append and remove lists in python. Develop programs to understand the control structures of python.	2
5	**Experiment 4** Write a program to demonstrate working with tuples in python. Write a program to demonstrate working with dictionaries in python.	2
6	**Experiment 5** Write a python program to find largest of three numbers. Write a python program to convert temperature to and from Celsius to Fahrenheit.	2
7	**Experiment 6** Write a python program to print prim numbers less than given number. Write a python program to find factorial of a number using recursion	2
8	**Experiment 7** Write a python program to that accepts length of three sides of a triangle as inputs. The program should indicate whether or not the triangle is a right-angled triangle (use Pythagorean theorem)	2
9	**Experiment 8** Write a python program to define a module to find Fibonacci Numbers and import the module to another program. Write a python program to define a module and import a specific function in that module to another program.	2
10	**Experiment 9** Write a python Program to call data member and function using classes and objects. Write a program to read 3 subject marks and display pass or failed using class and object.	2
11	**Experiment 10** Write a program to validate PAN card number and Email ID. Write a GUI program to create Tic-tac-toe in python.	2
12	**Experiment 11** Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first the second file. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.	2

MR. CHANDRASINH DHIRUBHA PARMAR
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
13	**Experiment 12** Write a GUI program to implement CRUD operation on Student record. (rollno, name, percentage) [Use data set of your choice from Open Data Portal (https://data.gov.in/) for the following exercises] Practical based on NumPy ndarray	2
14	**Experiment 13** Practical based on Pandas Data Structures Practical based on Data Loading, Storage and File Formats	2
15	**Experiment 14** Practical based on Interacting with Web APIs Simulate continuous time elementary signals.	2
16	**Experiment 15** Simulate basic operations on continuous time elementary signals. Simulate discrete time elementary sequences.	2
17	**Experiment 16** Simulate basic operations on discrete time elementary sequences. Simulate sampling on continuous time signals and generate frequency spectrums of signal before and after sampling.	2
18	**Experiment 17** Simulate reconstruction of continuous time signals from discrete time sequences, observe effect of sampling rate changes and aliasing in frequency domain spectrums. Simulate a program to analyze discrete time LTI System.	2
19	**Experiment 18** Find poles, zeros and gain from a given transfer function and plot it on Z-plane. Simulate the Fourier series representation of a continuous time periodic signal.	2
20	**Experiment 19** Simulate frequency domain analysis of discrete time sequences. Simulate correlation and convolution operation discrete time sequences.	2
Total Hours		**94**

Textbook :

1 Learning Python, Mark Lutz , O'Reily, 2009
2 Programming Python, Mark Lutz, O'Reily, 2010
3 Python 3 for Absolute Beginners, 3. Tim Hall, J-P Stacey , Apress, 2009
4 Beginning Python: From Novice to Professional, Magnus Lie Hetland , Apress, 2005
5 Introduction to Computer Science Using PYTHON: A Computational Problem-Solving Focus, C. Dierbach, Wiley, 2015
6 Let Us Python, Yashavant Kanetkar, BPB Publishers, 2019
7 Think Python: How to Think Like a Computer Scientist, Allen B. Downey, O'Reilly, 2015
8 Python: The Complete Reference, Martin C. Brown, McGraw-Hill, 2001

Textbook :

9 Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython, McKinney, W, O'Reilly Media, 2017

10 Doing Data Science: Straight Talk from the Frontline, O'Neil, C., & Schutt, R, O'Reilly Media, 2013

References:

1 Python for Signal Processing, Python for Signal Processing, José Unpingco, Springer, 2013

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
15.00	20.00	25.00	15.00	15.00	10.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of the students. The teacher in addition to conventional teaching method (Chalk and Talk) may use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc. for effective teaching.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of the semester for evaluation of performance of students in laboratory

4 For effective communication with students, canvas LMS (Learning Management System) is used.

Supplementary Resources:

1 https://docs.python.org/3/tutorial/

2 https://www.learnpython.org/

3 https://nptel.ac.in/courses/106/106/106106182/

MR. CHANDRASINH DHIRUBHA PARMAR
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)