	Python Programming	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basics of mathematics and knowledge of computer				
Co-requisites					

Course Objectives

1. To learn the basics of python programming.
2. To develop programming skills in python.
3. To understand the intermediate knowledge about various data structures in python language.

Course Outcomes

On completion of this course, the students will be able to

CO1. To know the basic python programming concepts, data structures & regular expressions.
CO2. Discuss file handling operations and understand OOPS concepts using python.
CO3. Develop modules and implement web development framework.
CO4. Discuss the role of python in advance technology.

Catalog Description

Python is a programming language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data understanding and exploration. It covers data types, control flow, object-oriented programming, and graphical user interface-driven applications. It also discusses text processing, simple graphics creation and image manipulation, HTML and web programming, and genomics. It enables various web applications concepts.

Course Content

Unit 1. An Introduction to Python

Introduction, A Brief History of Python, Python Versions, Installing Python, Environment Variables, Executing Python from the Command Line, IDLE, Editing Python Files, Python Documentation, Getting Help, Dynamic Types, Python Reserved Words, Naming Conventions

Basic Python Syntax

Basic Syntax, Comments, String Values, String Methods, The format Method, String Operators, Numeric Data Types, Conversion Functions, Simple Output, Simple Input, The % Method, The print Function

Language Components

Indenting Requirements, the if Statement, Relational and Logical Operators, Bit Wise Operators, the while Loop, break and continue, the for Loop.

Unit 2.

Collections

Introduction, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections, Summary

Functions

Introduction, Defining Your Own Functions, Parameters, Function Documentation, Keyword and Optional Parameters, Passing Collections to a Function, Variable Number of Arguments, Scope, Functions - "First Class Citizens", Passing Functions to a Function, map, filter, Mapping Functions in a Dictionary, Lambda, Inner Functions, Closures

Modules

Modules, Standard Modules – sys, math, time, The dir Function

Unit 3.

Exceptions

Errors, Runtime Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, raise, assert.

Input and Output

Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data from a File.

Unit 4.

Classes in Python

Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods, File Organization, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes

Unit 5.

Data Structures

List Comprehensions, Nested List Comprehensions, Dictionary Comprehensions, Dictionaries with Compound Values

Writing GUIs in Python

Introduction, Components and Events, An Example GUI, The Tk Widget, Button Widgets, Entry Widgets, Text Widgets, Checkbutton Widgets, Radiobutton Widgets, Listbox Widgets, Frame Widgets, Menu Widgets, Toplevel Widgets, Dialogs.

Unit 6.

Numerical Analysis & Plotting

Numpy – Overview, Setup, Datatypes, Basic Operators, Indexing, Broadcasting, Matrix Operators. Matplotlib-Overview, Setup, Basic plots, Customizing plots, Subplots, 3D plots.

Data Processing with Pandas

Pandas – Overview, Setup, Data Structures, Indexing & Selecting Data, groupby Operations, Reshaping data.

Text Book – Programming with Python (IBM ICE Publications 2018 Edition).

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	MSE	Quiz/Assignment/ etc.	ESE
Weightage (%)	%	%	%

Relationship between the Course Outcomes (COs), Program Outcomes (POs) and Program Specific Outcomes (PSOs):

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1															2
CO2	1			2									2		2
CO3	1	1		2									2	1	2
CO4	1	1		2										1	2
Average	1	1		2									2	1	2

1=Weak 2=Moderate 3=Strong

	Python Programming Lab	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Basic knowledge of computer system and elementary mathematics				
Co-requisites	--				

Course Objectives

1. To understand the fundamental of python programming language.
2. To write python scripting elements such as variables and flow control structures.

3. To use python library packages for solving domain problems.

Course Outcomes

CO1. To discuss procedural, object-oriented and functional programming paradigm using python programming language.
CO2. Use basic data structures like list, string, tuple, set and dictionary in python.
CO3. Implement various functional programming concepts like class, functions, mutable and immutable data, recursion using supported python library

Catalog Description

This course introduces the basic concepts of procedural and object-oriented programming using python programming language. This course also provides practical knowledge and hands-on experience in designing and implementing data structures. Activities covered include introduction to python programming language, datatypes, operators, loop structures, decision making statements, fundamental data structures, functions, Classes and Objects, Constructor, File Handling, Exception Handling and Numpy module.

List of Experiments

Lab Exercise	Contents
Experiment No 1	**Basic programming**
Experiment No 2	**To define variables and data types for simple mathematical calculations**
Experiment No 3	**Logical operators in mathematical calculations**
Experiment No 4	**Implement prime number, fibonacci and factorial programs**
Experiment No 5	**Text and string handling**
Experiment No 6	**Implement file handling**
Experiment No 7	**Implement file handling**
Experiment No 8	**Learn to create functions**
Experiment No 9	**Learn to create functions**
Experiment No 10	**Usage of python library packages**

Text Books

1. Python Programming by IBM

Reference Books

2. Python Programming by “Reema Thareja”
3. Learning Python – Mark Lutz, O’reilly publication

Continuous Evaluation- There will be continuous evaluation for all practical subjects of SCS during the semester. The performance of a student in a Practical subject will be evaluated as per process given below:

1. Components of evaluation
    a. Viva voce / Quiz (50%) + Performance & Records (50%).
    b. Lab performance and record evaluation shall be a continuous process throughout the semester.
    c. Minimum three Viva voce/ Quiz based on practical sessions shall be conducted during the semester.

Relationship between the Course Outcomes (COs), Program Outcomes (POs) and Program Specific Outcomes(PSOs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
Average	1	1.66	1										1.66		1

1 = Weak 2 = Moderate 3 = Strong