SARDAR VALLABHBHAI PATEL EDUCATION SOCIETY'S
R. N. G. PATEL INSTITUTE OF TECHNOLOGY - RNGPIT
An Autonomous Institute u/s UGC Act 1956
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Program Name: Integrated M.Sc. (I.T.)
Level: Post Graduate
Branch: Information Technology
Subject Code: 1BS304
Subject Name: Python Programming

w. e. f. Academic Year:	2025-26
Semester:	03
Category of the Course:	MINOR COURSE

Prerequisite:	**NIL**
Rationale:	This course covers Python fundamentals, including variables, control structures, and key libraries like NumPy, Matplotlib, and Pandas for efficient coding and data analysis.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Describe Python basics including syntax, variables, data types, strings, and I/O operations.
02	Construct programs using decision-making statements, loops, and functions.
03	Develop Python code with exception handling and object-oriented features.
04	Manipulate data using lists, tuples, sets, and dictionaries.
05	Perform computations and generate visualizations using NumPy and Matplotlib.
06	Utilize user defined libraries to manage data.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				SEE (TH)	IAT	CCE	SEE (P)	
2	0	4	4	70	30	20	30	150

Where SEE: Semester End Examination, IAT: Internal Assessment Test, CCE: Continuous and Comprehensive Evaluation

Course Content:

Unit No.	Content	No. of Hours	%of Weightage
1.	**UNIT 1 : Introduction to Python** 1.1 History and Features of Python 1.2 Installing Python and setting up IDEs 1.3 Python Variables 1.4 Python Identifiers 1.5 Python Operators 1.6 Python Data Types 1.7 Python Strings 1.8 Type Conversion and Input/Output Function 1.9 Comments and Indentation	**4**	**15**
2.	**UNIT 2: Control Structures & Loops** 2.1 Decision Making 2.2 Loops 2.2.1 While Loop 2.2.2 For Loop 2.2.3 Break, continue, pass 2.3 Functions in Python 2.3.1 Function declaration 2.3.2 Passing arguments to function 2.3.3 Return values 2.3.4 Variable scope and namespace 2.3.5 Lambda function	**7**	**20**

	2.3.6 Recursive function		
3.	**UNIT 3: Exceptions, Class, and Objects** 3.1 Classes and Objects 3.1.1 Creation of class and object 3.1.2 The_init_() function 3.1.3 Self parameter 3.2 Exception Handling 3.2.1 Try, catch, finally 3.2.2 Multiple error handling: except 3.2.3 Throwing a particular error: raise	**4**	**15**
4.	**UNIT 4: Data Structure in Python** 4.1 Lists: creation, indexing, slicing, methods 4.2 Tuples: immutability and use-cases 4.3 Sets: operations and uniqueness 4.4 Dictionaries: key-value pairs, methods, iteration	**4**	**15**
5.	**UNIT 5: Numpy and Matplot libraries** 5.1 NumPy basics 5.1.1 Introduction to Numpy 5.1.2 Key feature and benefits 5.1.3 Arrays 5.1.4 Operations 5.2 Matplotlib 5.2.1 Introduction to Matplotlib 5.2.2 Plot Types 5.3 Introduction of Pandas 5.3.1 Dataframes and series 5.3.2 Reading CSV Files 5.3.3 Data Exploration and Inspection	**7**	**20**
6.	**UNIT 6: User Defined Libraries** 6.1 Introduction 6.2 Creating User Defined Modules 6.3 Creating User Defined Packages 6.4 Importing and Using Libraries	**4**	**15**
	Total	**30**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**40**	**40**	**-**	**-**	**-**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Python Programming, Anurag Gupta, G Biswas,, Mc Graw Hill
2. Exploring Python, Timothy A. Budd, MCGraw Hill Publication
3. Core Python Programming, R. Nageswara Rao, Dreamtech Press
4. Learning Python, 5th Edition, Mark Lutz, O'Reilly Media
5. Python Projects, Laura Cassell, Alan Gauld, Wrox Publication

(b) Open source software and website:

1. https://www.jetbrains.com/pycharm/download
2. https://code.visualstudio.com/
3. https://www.python.org/
4. https://www.w3schools.com/python/
5. https://jupyter.org/

List of Laboratory/Learning Resources Required:

PRACTICAL LIST	
1	Create a program that accepts user input and displays the output after type conversion.
2	Develop a script that manipulates strings using indexing, slicing, and built-in string methods.
3	Create a Python script to print the multiplication table of a number using a for loop.
4	Write a program to calculate the factorial of a number using recursion.
5	Define a function that accepts marks of 5 subjects and returns total and average. Also, demonstrate the use of default and keyword arguments.
6	Write a Python program to handle division by zero using try, except, and finally.
7	Create a class Student with attributes name, roll_no, and marks. Include methods to set and display values. Use the __init__() method.
8	Create a NumPy array of random integers and plot a bar chart using Matplotlib to visualize the frequency of each value.
9	Read a CSV file using Pandas, display the first 5 rows, and
10	Create a user-defined Python module stringtools with functions to count vowels and reverse a string by user input.

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