



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Empowered Autonomous Institute)

NAAC A+ Grade (4th Cycle) with 3.49 CGPA,
UGC-CPE (Phase-III) & DST-FIST Status



Structure and Curriculum of
Certificate Course

in

Data Analysis Using Python
(Under PM-USHA)

Approved by

Board of Studies in Computer Science

Rajarshi Shahu Mahavidyalaya, Latur
(Empowered Autonomous Institute)

w. e. f. December, 2025



Shiv Chhatrapati Shikshan Sanstha's
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Certificate Course under PM- USHA
Data Analysis using Python
SYLLABUS
(Free of Cost Certificate Course)



Credits: 02

Max. Marks: 50

Lectures: 30 Hrs.

Learning Objectives:

LO 1 To understand Python syntax, semantics and core programming constructs.

LO 2 To apply Python for data manipulation, visualization.

LO 3 To develop modular reusable and scalable Python programs.

Course Outcomes:

After completion of course, the student will be able to-

CO 1 Write Python programs using control structures, functions and modules.

CO 2 Use Python libraries for data analysis and visualization.

Unit No.	Title of Unit & Contents	Hrs.
I	Introduction to Python and Functions, Modules	06
	i. Python Basics:Running Python, Hello World, Literals, Comments, Variables, Writing a Python Module, print(), User Input ii. Functions and Modules: Defining Functions, Scope, Global Variables, Parameters, Returning Values, Importing Modules iii. Math: Arithmetic Operators, Assignment Operators, Built-in Math Functions, math Module, random Module iv. Python Strings: Indexing, Slicing, Concatenation, String Methods, Formatting, Built-in Functions v. Iterables (Sequences, Dictionaries, Sets): Definitions, Sequences, Unpacking, Dictionaries, len(), Sets	
	Unit Outcome: UO 1. Write basic Python programs using variables, operators, functions	
II	Looping, Exception Handling and File Processing	06
	i. Flow Control: Conditionals, Loops, break, continue, enumerate() ii. Exception Handling: except, else, finally, Raising Exceptions iii. Dates and Times: time Module, datetime Module iv. File Processing: Opening files, Reading contents	

Unit No.	Title of Unit & Contents	Hrs.
	Unit Outcome: UO.1 Handle user input and exceptions effectively in Python scripts	
III	Introduction to Pandas, DataFrames	11
	i. Pandas: Overview, Series, DataFrames, Applications ii. DataFrame: Creating DataFrames, Attributes, Methods, Basic Operations iii. Reading and Writing Files: CSV (read_csv, to_csv), Excel (read_excel, to_excel) iv. GroupBy: groupby(), Aggregations (sum, mean, etc.), reset_index() v. Concatenating DataFrames: Rows, Columns, Handling Index vi. Merging DataFrames: merge(), Index-based merges vii. Melting DataFrames: melt(), Handling Missing Values viii. Stacking DataFrames: stack(), Handling Missing Values ix. Pivoting DataFrames: pivot_table()	
	Unit Outcome: UO 1. Use python libraries for analyzing the data	
IV	Handling Data and working with Libraries in Python	07
	i. Handling Missing Data: isna(), notna(), fillna(), dropna(), interpolate() ii. Grouping and Aggregating Data: Aggregate Functions, GROUP BY, HAVING iii. Subqueries: Summary statistics, Handling Missing Values iv. Cross Tables: crosstab(), Handling Missing Values v. NumPy Basics: Arrays (np.array, zeros, ones, arange, linspace), Array Operations vi. Introduction to Matplotlib: Pyplot basics, Format Strings, Legends, Labels, Titles, Bar Charts, Histograms, Pie Charts, Saving Charts vii. Introduction to Seaborn: Import Seaborn, Plotting (scatterplot, barplot, histplot, boxplot), Customization, Display, Save	
	Unit Outcome: UO 1. Use Python libraries for data analysis and visualization	

Practical Implementation:

Hands on practice on above all the content.

Learning Resources:

1. Core Python Programming by Dr. R. Nageswara Rao
2. Python for Data Analysis, Wes McKineey, O'Reeilly Media

Examination Framework:**Continuous Assesment Test(CAT):**

5 marks for attendance

15 marks internal tests

Final Examination:

30 marks for practical examination

Dr. R.R.Londhe

Chairman

Board of Studies in Computer Science
Rajarshi Shahu Mahavidyalaya, Latur
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Dr. Mahadev Gavhane

Principal

Rajarshi Shahu Mahavidyalaya, Latur
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