GANPAT UNIVERSITY

FACULTY OF PHARMACY

Programme	Bachelor of Pharmacy				Branch	General			
Semester	I				Version	3.0.0.0			
Effective from Academic Year	2026-27				Effective for the Batch admitted in	July 2026			
Course Code	BP101T	Course Name	Basics of Python Programming for Pharmaceutical Sciences (Theory)						
Scheme	Teaching Scheme (Per week)					Examination Scheme (Marks)			
	L	TU	P	TW	Total		CE	SEE	Total
Credit	2	0	0	--	2	Theory	20	30	50
Hours	2	0	0	--	--	Practical	-	-	-
Pre-requisites	Nil / Basic knowledge of Chemistry and Biology								

COURSE OBJECTIVES

The objectives of this course are to:

1. Introduce the fundamentals of Python programming for pharmaceutical sciences.
2. Develop basic programming skills using control structures, functions, and data structures.
3. Provide knowledge of data handling techniques for structured dataset management.
4. Familiarize students with data analysis tools such as NumPy and Pandas for healthcare datasets.
5. Enable students to visualize and interpret pharmaceutical data.

Course Outcomes

On successful completion of the course, the students will be able to:

CO1	Explain the fundamentals of Python programming, including variables, data types, operators, and libraries.
CO2	Analyze program logic using control structures and functions.
CO3	Organize, manipulate, and retrieve data using data structures and file handling techniques.
CO4	Analyze pharmaceutical datasets using Python libraries.
CO5	Visualize and interpret pharmaceutical data using graphical tools.

Theory Syllabus

Unit	Content	Hrs.
I	Introduction to Python Programming • Installing Python and an Integrated Development Environment (IDE) [Jupyter Notebook, PyCharm, VS Code etc.], Advantages of IDEs over text editors. • Python variables and data types (integers, floats, strings, booleans), Type casting and basic operators (arithmetic, comparison, logical), Input and output operations. • Basic string operations and manipulation techniques. • Introduction to standard libraries and third-party libraries, installing and uninstalling libraries.	06
II	Control Structures & Functions • Conditional statements (if, if-else, if-elif-else), nested conditions. • Loops (for loop, while loop). Break and continue statements. • Defining and calling functions, passing arguments and returning values. • Writing modular programs for simple pharmaceutical applications – dosage calculation and BMI calculation.	06
III	Data Structures & File Handling	06

	• Lists, tuples, and dictionaries. Indexing and slicing lists, basic operations on lists and dictionaries, string manipulation techniques. • Introduction to NumPy arrays, basic operations using NumPy (array creation, arithmetic operations). • Reading and writing CSV files. Understanding structured healthcare datasets. • Importing small pharmaceutical datasets and performing basic data access and manipulation tasks.	
IV	Data Handling with Pandas • Introduction to Pandas library. Pandas Series and DataFrame structures. • Reading CSV and Excel files – PK study datasets and ADR reports. • Inspecting datasets using head(), tail(), info(), and describe(). • Data cleaning techniques and handling missing values. Filtering and selecting data based on conditions. • Grouping data and performing aggregation functions.	06
V	Data Visualization with Matplotlib • Introduction to Matplotlib. Creating line plots, histograms, scatter plots, and box plots. • Labeling axes, titles, and legends. • Create plots and visualize pharmaceutical datasets – concentration-time curves for oral and IV administration, ADR reporting rates across drugs, dissolution profiles. • Scientific interpretation of plots.	06

Text Books

1. Weiss, C.J. (2017). Scientific Computing for Chemists with Python. Available at: https://weisscharlesj.github.io/SciCompforChemists
2. Perkovic, L. (2015). Introduction to Computing Using Python: An Application Development Focus. 2nd ed. Hoboken: Wiley.

Reference Books

3. Sweigart, A. (2025). Automate the Boring Stuff with Python. 3rd ed. Available at: https://automatetheboringstuff.com/
4. W3Schools. Python Tutorial. Available at: https://www.w3schools.com/python/
5. Healthcare datasets: Kaggle, healthdata.gov, WHO, data.gov.in, ctri.nic.in, clinicaltrials.gov. Always use data responsibly.

ICT / MOOCs Reference

6. Jupyter Notebook (https://jupyter.org/), Google Colab (https://colab.research.google.com/)
7. NPTEL – Python for Data Science course

Mapping of CO with PO and PSO:	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
CO1	2	1	-	3	1	-	-	-	-	-	2	2	1	1	-	3
CO2	1	3	1	3	2	-	-	-	-	-	2	2	2	3	-	2
CO3	1	2	3	3	2	-	-	-	-	-	2	2	3	2	-	2
CO4	2	3	3	3	3	-	1	-	1	-	2	3	3	3	1	2
CO5	2	3	2	3	3	-	2	1	1	-	2	3	2	3	1	2

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