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• Python Basic Concepts  
 o Python Program Environment  
 o Data types  
 o Variables  
 o Strings  
 o Operators  
 o Loops  
 o Control statements  
• Built-in Functions, Modules, Command Line Arguments, Keyword Arguments  
• Python Collection Objects, Classes  
• Strings, Files, I/O  
• Data Wrangling using Numpy and Pandas  
• Programs  
 o Program to find the power of a number  
 o Program to compute the GCD of two numbers  
 o Program to display prime numbers in a given range  
 o Program to display palindrome numbers in a given range  
 o Program to print a triangle of ‘\*’  
 o Program to print a triangle with numbers  
 o Program to find maximum of a list of numbers  
 o Program to find the sum of even and odd numbers separately in a list  
 o Program to search for an element in a list  
 o Program to perform matrix multiplication  
 o Program to perform Set operations  
 o Program to demonstrate String Operations  
 o Program to find the Mean, Median and Mode for a given set of numbers in a list with user-defined functions  
 o Program to define a function that can find all duplicate values in a list  
 o Program for basic working of ATM Machine using OOPs concepts  
 o Program to demonstrate various graphs and plots (Bar graph, Pie chart, Histogram, Box plot, Scatter plot)  
 o Program related to comprehension- map, filter and reduce  
 o Program related to Image processing

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• Hands-On Exploratory Data Analysis with Python  
 o Exploratory Data Analysis  
• Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython  
 o Data Wrangling  
 o Pandas  
 o NumPy  
 o IPython  
• Exploratory Data Analysis with Python  
 o Exploratory Data Analysis  
• Basic Front-end and Back-end Development  
 o Back-end: Introduction to Node.js, Express.js, RESTful API development  
 o Back-end: Python

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• Problem Solving and Python Programming Laboratory  
 o Write, test, and debug simple Python programs  
 o Implement Python programs with conditionals and loops  
 o Use functions for structuring Python programs  
 o Represent compound data using Python lists, tuples, dictionaries  
 o Read and write data from/to files in Python  
 o Compute the GCD of two numbers  
 o Find the square root of a number (Newton’s method)  
 o Exponentiation (power of a number)  
 o Find the maximum of a list of numbers  
 o Linear search and Binary search  
 o Selection sort, Insertion sort  
 o Merge sort  
 o First n prime numbers  
 o Multiply matrices  
 o Programs that take command line arguments (word count)  
 o Find the most frequent words in a text read from a file  
 o Simulate elliptical orbits in Pygame  
 o Simulate bouncing ball using Pygame

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• Introductory concepts  
 o Working environment  
 o Comparison with other programming languages  
• Basic syntax  
 o Expressions  
 o Types  
 o Statements  
 o Variables  
• Control constructs  
 o Branches  
 o Loops  
• Inbuilt containers  
 o Tuples  
 o Lists  
 o Sets  
 o Maps  
• Functions  
• Recursion  
• Exception handling  
• Introduction to program design  
• Introduction to functional programming  
 o Lambda expressions  
 o Coroutines  
 o Decorators  
 o Higher order functions  
• Introduction to object oriented programming  
 o Inheritance  
 o Polymorphism  
 o Duck typing  
• GUI programming (optional)