Python Roadmap

From foundational concepts to advanced machine learning applications

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Your Path to Python Mastery **(6 Levels – 36 Sessions)**

Embark on a structured journey to master Python, from foundational concepts to advanced machine learning applications.

1

Level 1: **Python Basics**

Variables & basic input/output fundamentals

2

Level 2: **Object-Oriented Programming**

Experience the power of objects

3

Level 3: **Data Structures & Algorithms**

Crack the code behind complexities

4

Level 4: **Problem Solving & Algorithms**

Train your brain like a pro coder

5

Level 5: **Data Analysis Basics**

Raw data to real insights

6

Level 6: **Machine Learning Basics**

Let the future unfold

Level 1: Python Basics

MGA

Goal

Learn the basics to write simple programs.

Topics

1. Installing Python and working with VS Code or Jupyter Notebook.
2. Variables & Arithmetic operations
3. String manipulation (upper(), lower(), strip(), split()).
4. Conditional statements (if, elif, else).
5. Loops (for, while).
6. Lists, Dictionaries, and Sets.
7. Functions
8. File handling (open(), read(), write()).

Simple Project

Build an Interactive Calculator or To-Do List App.

Level 2: Object-Oriented Programming (OOP)

MGA

Goal

Learn OOP concepts to structure code professionally.

Topics

1. Objects & Classes.
2. Encapsulation.
3. Inheritance.
4. Polymorphism.
5. Special methods (str, repr).
6. Using libraries like datetime, random, os.

Simple Project

Develop a Library Management System or Student Management System using OOP.

Level 3: Data Structures & Algorithms

MGA

Goal

Understand efficient data organization and performance improvement.

Topics

Stack & Queue

Linked Lists

Hash Tables

Binary Trees

Searching Algorithms(Linear & Binary)

Sorting Algorithms.(Bubble, Merge & Quick)

Simple Project

Create a Queue Management System.

Level 4: Problem Solving & Algorithms

MGA

1

Goal

Enhance logical thinking and tackle complex problems.

2

Topics

- Dynamic Programming
- Greedy Algorithms
- Backtracking
- Graphs & Graph Algorithms
- Solving challenges on LeetCode, Codeforces, HackerRank

3

Simple Project

Build a Tic-Tac-Toe Game with basic AI.

Level 5: Data Analysis Basics

MGA

1

Goal:

Learn data analysis using Python libraries.

2

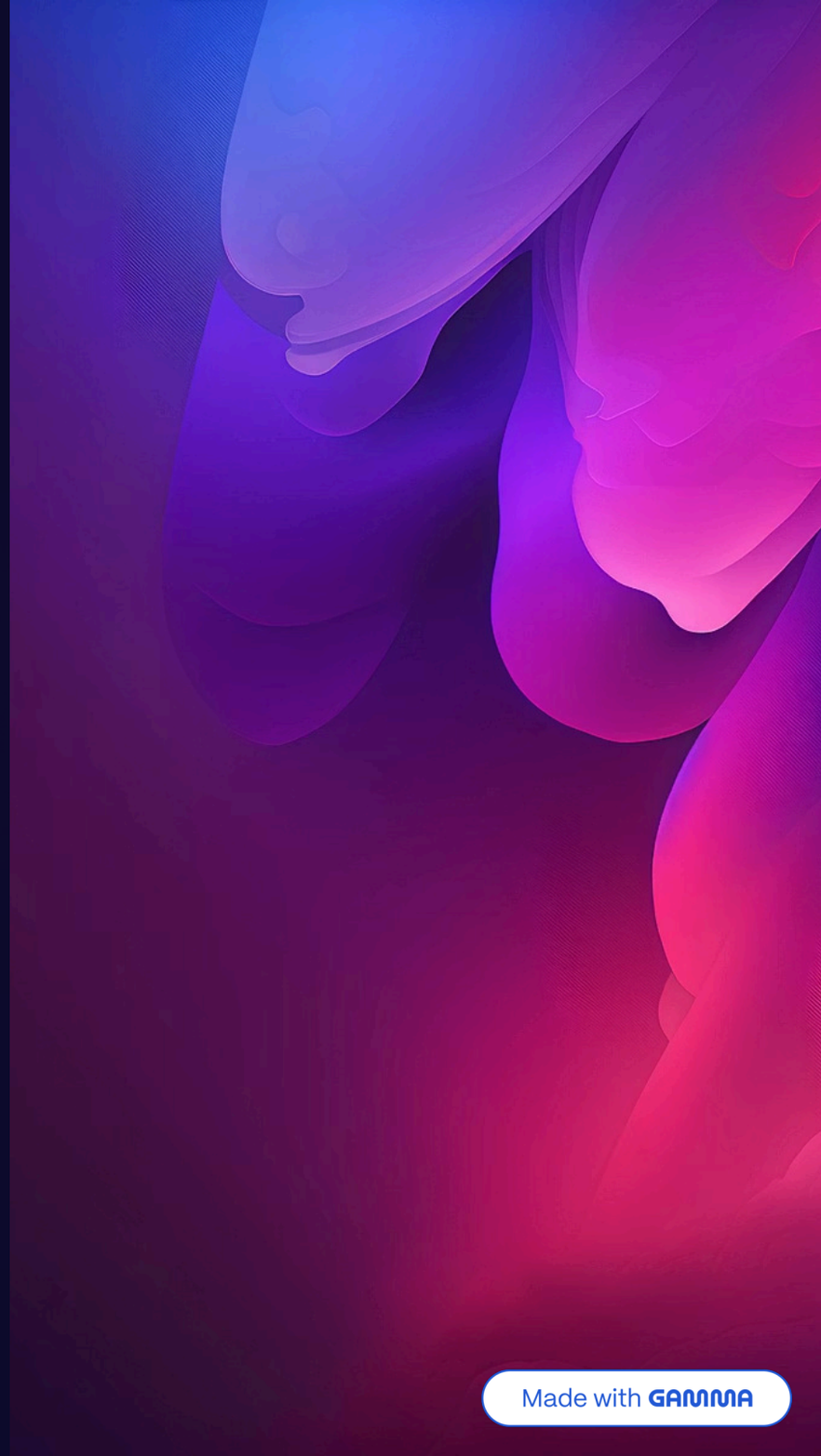
Topics

- NumPy: Arrays and numerical operations
- Pandas: Dataframes and data manipulation
- Matplotlib & Seaborn: Data visualization
- Data cleaning and exploration
- Reading data from CSV, JSON files

3

Simple Project

Analyze E-commerce Sales Data and create reports.



Level 6: Machine Learning Basics

MGA

1

Goal

Understand the fundamentals of machine learning.

2

Topics

- Introduction to Machine Learning
- Scikit-Learn and model building
- Basic Algorithms: Linear Regression, Classification using KNN & SVM
- Text data analysis using NLTK or spaCy

3

Simple Project

Build a Movie Recommendation System.