

# AI & ML Using Python - Beginner and Advanced Syllabus

## Beginner-Level Syllabus

(Duration: 12 Weeks, 5 Classes per Week)

Focus: Build Python foundation + intro to ML tools and basic ML concepts.

### Week 1: Python Basics

- **Day 1:** Python Intro
- **Day 2:** Python Syntax
- **Day 3:** Python Comments + Python Variables
- **Day 4:** Python Data Types + Python Numbers
- **Day 5:** Python Casting + Python Strings

### Week 2: Core Python Programming

- **Day 6:** Python Booleans + Python Operators
- **Day 7:** Python Lists
- **Day 8:** Python Tuples
- **Day 9:** Python Sets
- **Day 10:** Python Dictionaries

### Week 3: Control Flow & Functions

- **Day 11:** Python If...Else + Python Match
- **Day 12:** Python While Loops
- **Day 13:** Python For Loops
- **Day 14:** Python Functions
- **Day 15:** Python Lambda

### Week 4: Intermediate Structures

- **Day 16:** Python Arrays
- **Day 17:** Python OOP Concepts
- **Day 18:** Python Classes/Objects
- **Day 19:** Python Inheritance

- **Day 20:** Python Iterators

### **Week 5: OOP Deep Dive + Scope**

- **Day 21:** Python Polymorphism
- **Day 22:** Python Scope
- **Day 23:** Python Modules
- **Day 24:** Python Dates
- **Day 25:** Python Math

### **Week 6: Working with Data**

- **Day 26:** Python JSON
- **Day 27:** Python RegEx
- **Day 28:** Python PIP
- **Day 29:** Python Try...Except
- **Day 30:** Python String Formatting + User Input

### **Week 7: Environment & Revision**

- **Day 31:** Python Virtual Environment Setup
- **Day 32:** Hands-on Practice / Revision 1
- **Day 33:** Hands-on Practice / Revision 2
- **Day 34:** Mini Project 1 (Basic Calculator, Quiz, etc.)
- **Day 35:** Quiz or Test on all topics so far

### **Week 8: File Handling + JSON + Regex**

- **Day 36:** File Read/Write/Delete
- **Day 37:** Python JSON Handling
- **Day 38:** Python Dates and Math
- **Day 39:** Regex Basics
- **Day 40:** PIP and Virtual Environment

### **Week 9: NumPy & Pandas (Basics)**

- **Day 41:** NumPy Arrays and Operations
- **Day 42:** Indexing, Slicing, Broadcasting
- **Day 43:** Pandas Series and DataFrames
- **Day 44:** Data Import/Export (CSV, Excel)
- **Day 45:** Missing Data Handling

### **Week 10: Matplotlib & Basic Statistics**

- **Day 46:** Pyplot Intro, Basic Plots
- **Day 47:** Labels, Legends, Subplots
- **Day 48:** Histograms, Pie Charts
- **Day 49:** Mean, Median, Mode
- **Day 50:** Standard Deviation, Data Distribution

### **Week 11: Machine Learning Introduction**

- **Day 51:** ML Overview and Applications
- **Day 52:** Linear Regression
- **Day 53:** Train/Test Split
- **Day 54:** KNN (K-Nearest Neighbors)
- **Day 55:** Missing Data Handling

### **Week 12: Machine Learning Core**

- **Day 56:** Supervised vs Unsupervised Learning
- **Day 57:** Linear/Polynomial Regression
- **Day 58:** Logistic Regression
- **Day 59:** KNN, Naive Bayes
- **Day 60:** SVM (Support Vector Machine)

# Advanced Level – Syllabus

(Duration: 18 Weeks, 5 Classes per Week)

Focus: Build Python foundation + intro to ML tools and advanced ML concepts.

## Week 1: Python Basics

- **Day 1:** Python Intro
- **Day 2:** Python Syntax
- **Day 3:** Python Comments + Python Variables
- **Day 4:** Python Data Types + Python Numbers
- **Day 5:** Python Casting + Python Strings

## Week 2: Core Python Programming

- **Day 6:** Python Booleans + Python Operators
- **Day 7:** Python Lists
- **Day 8:** Python Tuples
- **Day 9:** Python Sets
- **Day 10:** Python Dictionaries

## Week 3: Control Flow & Functions

- **Day 11:** Python If...Else + Python Match
- **Day 12:** Python While Loops
- **Day 13:** Python For Loops
- **Day 14:** Python Functions
- **Day 15:** Python Lambda

## Week 4: Intermediate Structures

- **Day 16:** Python Arrays
- **Day 17:** Python OOP Concepts
- **Day 18:** Python Classes/Objects

- **Day 19:** Python Inheritance
- **Day 20:** Python Iterators

### **Week 5: OOP Deep Dive + Scope**

- **Day 21:** Python Polymorphism
- **Day 22:** Python Scope
- **Day 23:** Python Modules
- **Day 24:** Python Dates
- **Day 25:** Python Math

### **Week 6: Working with Data**

- **Day 26:** Python JSON
- **Day 27:** Python RegEx
- **Day 28:** Python PIP
- **Day 29:** Python Try...Except
- **Day 30:** Python String Formatting + User Input

### **Week 7: Environment & Revision**

- **Day 31:** Python Virtual Environment Setup
- **Day 32:** Hands-on Practice / Revision 1
- **Day 33:** Hands-on Practice / Revision 2
- **Day 34:** Mini Project 1 (Basic Calculator, Quiz, etc.)
- **Day 35:** Quiz or Test on all topics so far

### **Week 8: File Handling + JSON + Regex**

- **Day 36:** File Read/Write/Delete
- **Day 37:** Python JSON Handling
- **Day 38:** Python Dates and Math
- **Day 39:** Regex Basics
- **Day 40:** PIP and Virtual Environment

### **Week 9: NumPy & Pandas (Basics)**

- **Day 41:** NumPy Arrays and Operations
- **Day 42:** Indexing, Slicing, Broadcasting
- **Day 43:** Pandas Series and DataFrames
- **Day 44:** Data Import/Export (CSV, Excel)
- **Day 45:** Missing Data Handling

### **Week 10: Matplotlib & Basic Statistics**

- **Day 46:** Pyplot Intro, Basic Plots
- **Day 47:** Labels, Legends, Subplots
- **Day 48:** Histograms, Pie Charts
- **Day 49:** Mean, Median, Mode
- **Day 50:** Standard Deviation, Data Distribution

### **Week 11: Machine Learning Introduction**

- **Day 51:** ML Overview and Applications
- **Day 52:** Linear Regression
- **Day 53:** Train/Test Split
- **Day 54:** KNN (K-Nearest Neighbors)
- **Day 55:** Missing Data Handling

### **Week 12: Machine Learning Core**

- **Day 56:** Supervised vs Unsupervised Learning
- **Day 57:** Linear/Polynomial Regression
- **Day 58:** Logistic Regression
- **Day 59:** KNN, Naive Bayes
- **Day 60:** SVM (Support Vector Machine)

### **Week 13: Python Matplotlib Basics**

- **Day 61:** Matplotlib Intro + Get Started
- **Day 62:** Matplotlib Pyplot + Plotting
- **Day 63:** Matplotlib Markers + Line
- **Day 64:** Matplotlib Labels + Grid
- **Day 65:** Matplotlib Subplot

### **Week 14: Python Matplotlib Charts**

- **Day 66:** Matplotlib Scatter
- **Day 67:** Matplotlib Bars
- **Day 68:** Matplotlib Histograms
- **Day 69:** Matplotlib Pie Charts
- **Day 70:** Project: Plot All Chart Types (Mini Project / Revision)

### **Week 15: ML Basics + Data Understanding**

- **Day 71:** ML Intro + Getting Started
- **Day 72:** Mean, Median, Mode
- **Day 73:** Standard Deviation + Percentile
- **Day 74:** Data Distribution + Normal Distribution
- **Day 75:** Scatter Plot + Linear Regression (Hands-on)

### **Week 16: Regression Models**

- **Day 76:** Polynomial Regression
- **Day 77:** Multiple Regression
- **Day 78:** Data Scaling + Train/Test Split
- **Day 79:** Decision Tree
- **Day 80:** Confusion Matrix + Evaluation

### **Week 17: Classification & Clustering**

- **Day 81:** Logistic Regression

- **Day 82:** Hierarchical Clustering
- **Day 83:** K-Means Clustering
- **Day 84:** Categorical Data + Grid Search
- **Day 85:** Project Work / Doubt Clearing Session

### **Week 18: Advanced Topics + Model Evaluation**

- **Day 86:** Bootstrap Aggregation (Bagging)
- **Day 87:** Cross Validation
- **Day 88:** AUC - ROC Curve
- **Day 89:** K-Nearest Neighbors
- **Day 90:** Final Project / Quiz / Summary

**Tools & Technologies used:** Python, NumPy, Pandas, Matplotlib, Scikit learn, Jupyter Notebook, Google Colab, Idle Python, VS Code.