## Integrated Python Course

### Course Introduction

The Integrated Python Course is a comprehensive, hands-on program designed to equip learners with a holistic mastery of Python across diverse domains. Starting with core Python programming, the course progresses through version control with Git, file operations (local and cloud-based with AWS S3 and Azure), data analytics, REST API development, and AI integration. It further explores extensive libraries like PyTorch, web frameworks (Django, Flask), business intelligence, statistical analysis with R, web scraping, desktop GUI applications, microservices, and cloud technologies (AWS Lambda, S3, NoSQL databases, SNS, SQS). This structured roadmap is ideal for beginners and professionals aiming to leverage Python for full-stack development, data science, AI, and cloud-based solutions.

### Course Outcomes

By the end of this course, participants will be able to:

- Master Python Core Learning: Grasp fundamental concepts including data types, loops, functions, and control structures.

- Utilize Version Control: Apply base Git commands effectively to manage Python repositories.

- Manage File Operations: Perform basic file operations (upload, download) with the filesystem and integrate with AWS S3 using boto3 libraries and Azure.

- Conduct Data Analytics: Analyze and process data using Python's data analytics tools.

- Develop REST APIs: Build and manage endpoints using FastAPI and understand REST API principles.

- Integrate Python with AI: Explore AI frameworks like ChatGPT and Grok, leveraging Python for intelligent applications.

- Leverage Extensive Libraries: Utilize PyTorch and machine learning libraries for advanced projects.

- Develop Web Applications: Create dynamic web applications using Django and Flask frameworks.

- Apply Business Intelligence: Implement Python-based solutions for business intelligence tasks.

- Perform Statistical Analysis: Use Python alongside R for statistical intelligence and data interpretation.

- Implement Web Scraping: Extract and process data from websites using Python tools.

- Build Desktop GUI Applications: Design user interfaces for desktop applications with Python.

- Design Microservices: Develop and deploy Python-based microservices.

- Integrate with AWS Stack: Work with AWS services like Lambda, S3, and manage cloud workflows.

- Manage NoSQL Databases: Handle document databases (MongoDB), RDS, and DynamoDB with Python.

- Manage Relational Databases: Handle relational databases like Amazon RDS, SQL etc.

- Utilize Messaging Services: Implement SNS and SQS for message queuing and notifications using Python.

### Intro to Integrated Python & Core Concepts

- Foundations of Integrated Python

- Python Basics (Data Types, Loops, Functions)

- Operators, Expressions

- Control Structures

### Version Control & File Operations

- Introduction to Git and Version Control

- Basic Git Commands (commit, push, pull)

- File Operations with Filesystem (Upload, Download)

- File Operations with AWS S3 and boto3

- File Operations with Azure

### Data Analytics & API Development

- Introduction to Python Data Analytics

- Data cleaning techniques: handling missing data, outliers, duplicates

- Data wrangling and transformations

- REST API Basics with FastAPI

- Creating and Managing Endpoints

### AI Integration & Libraries

- Matplotlib & Seaborn for visualizing data (histograms, scatter plots, box plots)

- Introduction to interactive dashboards using Plotly

- Integration with AI Frameworks (ChatGPT, Grok)

- Working with PyTorch and Machine Learning Libraries

### Web Development & Business Intelligence

- Django and Flask for Web Applications

- Developing Dynamic Web Applications

- Introduction to Business Intelligence with Python

- Implementing BI Solutions

### Statistical Analysis & Web Scraping

- Statistical Analysis with Python and R

- Creating Statistical Models

- Web Scraping Techniques in Python

- Extracting and Processing Web Data

### Desktop GUI & Microservices

- Introduction to Desktop GUI Applications

- Designing User Interfaces with Python

- Basics of Microservices in Python

- Deploying Python Microservices

### Cloud Integration & Database Management

- AWS Stack Integration (Lambda, S3)

- Managing Data Flow with AWS Services

- NoSQL Databases (MongoDB, DynamoDB)

- Relational Databases (Amazon RDS, SQL)

### Messaging Services & Advanced Topics

- Implementing SNS and SQS with Python

- Message Queuing and Notifications

- Advanced Python Libraries and Tools

### Projects

- E-commerce File Management Project

- AI Chatbot Development Project

- Cloud-Based Web Application Project

### #### Developer Roadmap

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### Capstone Projects

E-commerce File Management

1. E-commerce platforms rely heavily on efficient file management for product uploads, customer data, and order processing. This project involves creating a system to handle file operations locally and on AWS S3 using boto3, ensuring secure upload and download processes. Data cleaning and manipulation are essential, with feature engineering to optimize storage and retrieval. Implement multiple models to manage file integrity and defend your project design.

AI Chatbot Development

2. AI chatbots are transforming customer service by providing real-time responses. This project requires building a chatbot integrated with frameworks like ChatGPT or Grok, focusing on natural language processing. Data cleaning and manipulation are vital to train the model effectively. Use feature engineering and exploratory data analysis, applying cross-validation and performance metrics to select the best model.

Cloud-Based Web Application

3. Developing a cloud-based web application involves deploying a Django or Flask app on AWS with Lambda and S3 integration. This project explores key features affecting performance, such as database management (RDS, DynamoDB) and messaging (SNS, SQS). Conduct extensive data exploration, use multiple machine learning models with hyperparameter tuning, and optimize for scalability.

### #### Course Curriculum

### ##### Integrated Python Course Curriculum

### ##### Introduction

- The Integrated Python Course is a 4-month, intensive, and structured program designed to equip learners with a holistic mastery of Python across diverse domains. This curriculum is designed using a clear developer roadmap, ensuring a step-by-step, comprehensive learning experience.

### ##### Developer Roadmap Overview

* Learn the Basics: Syntax, Data Types, Control Structures
* Version Control: Git Basics
* File Operations: Filesystem, AWS S3, Azure
* Data Analytics: Tools and Techniques
* API Development: FastAPI, Endpoints
* AI Integration: ChatGPT, Grok
* Libraries: PyTorch, Machine Learning
* Web Development: Django, Flask
* Business Intelligence: Python Solutions
* Statistical Analysis: Python with R
* Web Scraping: Data Extraction
* Desktop GUI: User Interface Design
* Microservices: Deployment
* Cloud Integration: AWS Lambda, S3
* Database Management: NoSQL, Relational
* Messaging Services: SNS, SQS
* Real-World Projects: E-commerce, AI Chatbot, Cloud Web App

### Course Duration: 4 Months (16 Weeks)

- Total Working Days: 80 days (20 days per month)

- Module Completion: Every 5 days (16 modules total)

### Month 1

### Module 1: Introduction to Python Programming (Days 1-5)

- Setting Up Python Environment

- Running Your First Python Program

- Basic Syntax, Variables, Data Types

- Control Structures (if, else, loops)

### Module 2: Version Control with Git (Days 6-10)

- Introduction to Git

- Basic Commands (commit, push, pull)

- Managing Python Repositories

### Module 3: File Operations (Days 11-15)

- Filesystem Operations (Upload, Download)

- AWS S3 with boto3

- Azure File Integration

### Module 4: Data Analytics Basics (Days 16-20)

- Introduction to Data Analytics Tools

- Data Cleaning Techniques

- Data Wrangling

### Month 2

### Module 5: API Development (Days 21-25)

- REST API Basics

- FastAPI Installation

- Creating Endpoints

### Module 6: AI Integration (Days 26-30)

- Introduction to AI Frameworks

- Integrating ChatGPT and Grok

- Basic AI Applications

### Module 7: Working with Libraries (Days 31-35)

- Introduction to PyTorch

- Machine Learning Libraries

- Practical Implementation

### Module 8: Web Development (Days 36-40)

- Django and Flask Basics

- Developing Web Applications

- Deployment Basics

### Month 3

### Module 9: Business Intelligence (Days 41-45)

- Introduction to BI with Python

- Implementing BI Solutions

- Data Visualization

### Module 10: Statistical Analysis (Days 46-50)

- Python with R Integration

- Statistical Models

- Data Interpretation

### Module 11: Web Scraping (Days 51-55)

- Web Scraping Techniques

- Extracting Web Data

- Processing Scraped Data

### Module 12: Desktop GUI (Days 56-60)

- Introduction to GUI Applications

- Designing User Interfaces

- Basic GUI Projects

### Month 4

### Module 13: Microservices (Days 61-65)

- Microservices Basics

- Developing Microservices

- Deployment Strategies

### Module 14: Cloud Integration (Days 66-70)

- AWS Lambda and S3

- Managing Cloud Workflows

- Integration Techniques

### Module 15: Database Management (Days 71-75)

- NoSQL Databases (MongoDB, DynamoDB)

- Relational Databases (RDS, SQL)

- Data Management Practices

### Module 16: Messaging Services (Days 76-80)

- Implementing SNS and SQS

- Message Queuing

- Notification Systems

### Projects (Integrated Learning)

- E-commerce File Management (Weeks 9-10)

- AI Chatbot Development (Weeks 11-13)

- Cloud-Based Web Application (Weeks 14-16)

### Conclusion

- Final Assessment

- Project Showcase

- Certificate Distribution