Python for DevOps

It covers foundational Python concepts, DevOps-specific modules, cloud automation, and advanced topics, including hands-on projects. Each day includes focused topics with detailed bullet-point descriptions highlighting DevOps relevance.

S. No	Day	Topics	Purpose / DevOps Relevance & Description
0	Day 0	Program Overview & Setup	• Importance of Python in DevOps automation, scripting, and cloud management. • Overview of course structure and learning objectives. • Tools installation: Python 3.x, VS Code, Git, AWS CLI. • Introduction to real-world DevOps use cases involving Python. • Setup of coding environment and version control. • Emphasis on hands-on practice and continuous learning.
1	Day 1	Python Basics: Variables & Data Types	• Detailed explanation of variables and data types: strings, integers, floats, booleans. • Mutable vs immutable types: lists, dictionaries, tuples. • Practical examples such as parsing configuration files, handling environment variables. • Foundation for scripting with different data structures in DevOps tasks.
2	Day 2	Pre-Assessment & Control Flow	• Baseline assessment of Python knowledge. • Conditional statements: if, elif, else. • Loop constructs: for, while loops, with break and continue. • Use cases: filtering logs, conditional automation based on environment variables. • Strengthen logical

			scripting for DevOps automation.
3	Day 3	Functions and Modules	• Defining reusable functions with positional, keyword, and default arguments. • Return values and modular code design. • Creating and importing custom modules. • Use cases: modular automation scripts like restarting services or backing up data. • Promotes clean, maintainable, and scalable DevOps scripts.
4	Day 4	Command-Line Arguments & Env Variables	• Parsing command-line inputs with sys.argv and argparse. • Reading and setting environment variables via os.environ. • Use cases: writing deployment scripts adaptable to staging/production environments. • Enhances script flexibility and dynamic behavior in CI/CD pipelines.
5	Day 5	File I/O Operations	• Reading and writing files using open() and context managers. • Handling logs, configuration files, JSON, and CSV data. • Use cases: parsing logs, updating config files, generating reports. • Enables automation of file-based workflows common in DevOps.
6	Day 6	Exception Handling & Logging	• Implementing try, except, finally blocks for error handling. • Using logging module with different log levels (DEBUG, INFO, WARNING, ERROR). • Creating robust, fault-tolerant automation scripts. • Structured logging facilitates debugging and monitoring of automation processes.
7	Day 7	Regular Expressions	• Mastering regex pattern matching,

			searching, and replacement using re module. • Practical applications: extracting IPs from logs, validating config files, renaming files in bulk. • Powerful text processing skills vital for log analysis, security auditing, and configuration validation.
8	Day 8	OS and File System Operations	• Using os and shutil modules for file/directory management (create, move, copy, delete). • Accessing platform info via platform module. • Secure input handling with getpass. • Automating system-level tasks like artifact management and environment interrogation.
9	Day 9	Subprocess & System Command Execution	• Running external shell commands with subprocess. • Capturing standard output, errors, and return codes. • Integration of CLI tools (Git, Docker, Kubernetes) with Python automation. • Enables orchestration of multi-tool workflows and legacy command line utilities.
10	Day 10	Working with JSON, YAML, CSV	• Parsing and generating JSON with json module. • Reading/writing YAML using PyYAML. • Handling CSV files for reports and inventories. • Automates data ingestion and export in formats common to infrastructure as code and configuration management.
11	Day 11	Networking Basics & Socket Programming	• Fundamentals of TCP/IP, HTTP, DNS. • Creating simple socket clients and servers. • DevOps uses: custom monitoring tools, health checks, network automation.

			• Facilitates network troubleshooting and service availability automation.
12	Day 12	API Automation Using Requests Module	• Making HTTP requests (GET, POST, PUT, DELETE) with requests module. • Handling authentication, headers, and error codes. • Integrating with cloud APIs, CI/CD systems, and monitoring platforms. • Enables programmatic control of DevOps tools and services.
13	Day 13	Flask / FastAPI for Building APIs	• Introduction to lightweight web frameworks Flask and FastAPI. • Building RESTful APIs and monitoring dashboards. • Use cases: expose internal tools, automation hooks, service health endpoints. • Enables creation of self-service portals and integration points within DevOps toolchains.
14	Day 14	System Monitoring with psutil	• Collecting CPU, memory, disk, network statistics. • Monitoring process info and sensor data. • Automating resource usage checks and alerting. • Helps maintain system health and performance via custom monitoring scripts.
15	Day 15	Object-Oriented Programming (OOP) – Part 1	• Concepts of classes, objects, attributes, methods. • Modeling infrastructure components as objects for modular code. • Enables development of reusable automation frameworks and better code organization.
16	Day 16	Object-Oriented Programming (OOP) – Part 2	• Inheritance, polymorphism, method overriding. • Extending base classes for different server or

			service types. • Facilitates scalable and maintainable automation for diverse environments.
17	Day 17	Concurrency & Parallelism	• Threading vs multiprocessing concepts. • Running multiple tasks simultaneously for efficiency. • Use cases: concurrent health checks, parallel deployments, log processing. • Improves automation script performance in multi-task environments.
18	Day 18	Testing Automation with unittest & pytest	• Writing unit and integration tests for scripts. • Automating tests for CI/CD pipeline integration. • Promotes code quality and reliability in production automation.
19	Day 19	AWS Automation Basics with boto3	• Setting up boto3 with AWS credentials. • Programmatic control of AWS services like EC2 and S3. • Automating cloud infrastructure provisioning, management, and monitoring tasks.
20	Day 20	Executing AWS CLI via subprocess	• Running AWS CLI commands using subprocess module. • Capturing and parsing command output for automation decisions. • Enables combining CLI tools with Python in hybrid automation workflows.
21	Day 21	AWS Lambda Powertools	• Using aws-lambda-powertools for logging, tracing, metrics in Lambda functions. • Standardizes observability and debugging for serverless DevOps automation.
22	Day 22	Data Processing with awswrangler & Pandas	• Using awswrangler to access AWS data stores through Pandas. • Automating ETL, data analysis, and reporting.

			• Supports cloud-native data operations in DevOps and DataOps pipelines.
23	Day 23	Secure Scripting Practices	• Securely handling passwords and secrets with getpass and environment variables. • Using IAM roles and policies. • Prevents secret leakage and enforces security best practices in automation scripts.
24	Day 24	Email Automation & Notifications	• Sending email alerts using smtplib. • Integrating notifications into monitoring and incident response workflows. • Improves proactive communication and operational awareness.
25	Day 25	Advanced Networking & Security Concepts	• DNS and HTTP fundamentals. • Automating network scans, firewall checks, SSL certificate validation. • Integrating security automation into DevOps workflows.
26	Day 26	Capstone Project Part 1: Design & Setup	• Define project scope based on learned concepts. • Architect automation for monitoring, alerting, cloud operations. • Setup code repositories and environments. • Prepares learners for hands-on implementation.
27	Day 27	Capstone Project Part 2: Implementation & Presentation	• Hands-on building and testing of capstone automation project. • Deploying solution, peer reviews, feedback session. • Reinforces practical skills and prepares learners for real-world DevOps challenges.