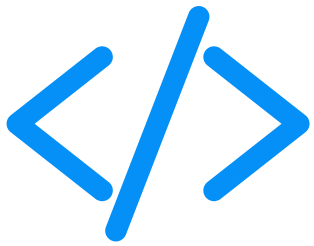
DevOps (Python)

Course Structure

CODENERA

MAKE IMAGINATION POSSIBLE



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Syllabus

Python Syllabus

- 1. Python Basics
- 2. Data Structures
- 3. File Handling
- 4. Object - Oriented Programming
- 5. Modules and Packages
- 6. System Administration with Python
- 7. Networking & Debugging

DevOps Syllabus

- 1. DevOps Fundamentals
- 2. Version Control
- 3. CI/CD Pipelines
- 4. Containerisation
- 5. Container Orchestration
- 6. Infrastructure as Code
- 7. Monitoring and Logging
- 8. Cloud Platform (AWS Preferred)

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Python Basics

- Introduction to Python
- Data Types and Variables
- Operators and Expressions
- Conditional Statements (if, else, elif)
- Loops (for, while)
- Functions and Lambda Expressions
- Exception Handling (try-except)

Data Structures, File Handling

- Lists, Tuples, Sets, Dictionaries
- List and Dictionary Comprehensions
- Iterators and Generators
- Reading & Writing Files
- Working with CSV and JSON

Object-Oriented Programming

- Classes and Objects
- Constructors, Inheritance, Polymorphism

Modules and Packages :

- Built-in Modules (os, sys, datetime)
- Custom Modules
- Virtual Environments (venv)

System Administration with Python

- Automating OS Tasks (os, shutil, subprocess)
- Parsing Logs
- Environment Variables
- Scheduling Jobs (cron, schedule, apscheduler)

Networking & APIs

- Working with requests
- Consuming REST APIs
- Socket Programming Basics

Testing & Debugging :

- Unit Testing with unittest and pytest
- Logging and Debugging Techniques

DevOps Syllabus (With Python Integration)

DevOps Fundamentals :

- What is DevOps?
- DevOps Lifecycle and Principles
- Agile vs DevOps

Version Control :

- Git Basics: clone, commit, push, pull
- Branching, Merging, and Rebase
- GitHub/GitLab Workflow

Python Git Automation (GitPython)

CI/CD Pipelines

- Introduction to CI/CD
- Jenkins:
- Installation & Configuration
- Writing Jenkinsfiles (Declarative)
- Building Python Projects
- GitHub Actions: YAML, Triggers, Workflows

Containerization

- Docker:
- Images & Containers
- Dockerfiles for Python apps
- Docker Compose
- Best Practices for Dockerizing Python apps

Container Orchestration

- **Kubernetes Basics:**
- **Pods, Deployments, Services**
- **YAML Manifest Writing**
- **Python + K8s using kubernetes Python client**
- **Helm Basics**

Infrastructure as Code

- **Terraform Basics**
- **Provisioning Infra on AWS**
- **Writing Python scripts to trigger Terraform (os.system, subprocess)**

Monitoring and Logging

- Prometheus + Grafana
- ELK Stack Overview
- Python logging to ELK or external tools

Configuration Management

- Ansible:
- Writing Playbooks
- Python integration (Jinja templating, Custom Modules)
- Automating deployments

Cloud Platform (AWS Preferred)

- AWS Services for DevOps:
- Basics of Azure and Google Cloud Platform
- EC2, S3, IAM, CloudWatch
- Python with Boto3 for AWS automation
- Deployment with CodeDeploy + Jenkins

Capstone Projects

- **Automate Server Health Monitoring with Python + Cron + Slack Alerts**
- **Build a CI/CD Pipeline for a Python Web App using Jenkins/Docker/K8s**
- **Use Ansible to Configure and Deploy a Python App on AWS EC2**
- **Automate Infrastructure Provisioning using Terraform + Python Wrapper**