Ansible and Python with Developing Applications and Automating Workflows using Cisco Platforms (DEVASC)

Introduction: Python and **ansible** are the important tools required for Network Automation and development. This course is designed for network engineers who want to work in the field of Network Development and Automation but have no knowledge of programming in Ansible or Python. The course first covers python and ansible and later covers the implementation of basic network applications using Cisco platforms as a base, and how to implement automation workflows across network, security, collaboration, and computing infrastructure. The course gives you hands-on experience solving real world problems using Cisco Application Programming Interfaces (APIs) and modern development tools. This course also helps prepare you for **Cisco Certified DevNet Associate** exam and certification.

Duration: 10 Days

Hands-On Format: This hands-on class is approximately 60/40 lab to lecture ratio, combining engaging lecture, demos, group activities and discussions with comprehensive machine-based practical programming labs and project work.

Prerequisites: Basic knowledge of Linux CLI and Cisco Networks

Module 1 – Introduction to Python

Python intro
Installing python
Python 2 vs Python 3
Python syntax and comments
Python variables
Input in Python

Module 2 – Data types & Operators

Numbers and Strings
List, tuples and sets
Dictionary & Range
Arithmetic and Assignment operators
Comparison and Logical operators
Identity, Bitwise and Membership operators

Module 3 – Conditions & loops in Python

If, elif & else
Shorthand if else (Ternary operator)
Nested if
Pass statement
Python while loop
For loop in python
Break & Continue statement

Module 4 – Functions and Modules

Python inbuilt functions
Arguments
Creating own functions
Lambda function
Return statement
Inbuilt Modules
Creating own modules
Variables in module
Renaming a module

Module 5 – Introduction to Ansible
Ansible Concepts
How ansible works

Install Ansible
Infrastructure as a code (IAC)
Ansible Commands
Ansible Modules
Ad-HOC Execution

Module 6 – Playbooks, variables & facts

Automate tasks with playbook
Run playbook on multiple hosts
Use Variables in Playbook
Simplify Management
Ansible facts
Gather managed hosts information

Module 7- Ansible Task Control & Roles

Handlers
Playbook Task errors
Ansible roles
Reuse ansible code

Module 8 – Linux Administration tasks

Managing users with ansible
Managing packages with ansible
Managing storage with ansible

Cisco DevAsc

Objective

After this section, you should be able to:

- Describe the importance of APIs and use of version control tools in modern software development
- Describe common processes and practices used in software development
- Describe options for organizing and constructing modular software
- Describe HTTP concepts and how they apply to network-based APIs
- Apply Representational State Transfer (REST) concepts to integration with HTTP-based APIs
- Describe Cisco platforms and their capabilities
- Describe programmability features of different Cisco platforms
- Describe basic networking concepts and interpret simple network topology
- Describe interaction of applications with the network and tools used for troubleshooting issues
- Apply concepts of model-driven programmability to automate common tasks with Python scripts
- Identify common application deployment models and components in the development pipeline
- Describe common security concerns and types of tests, and utilize containerization for local development
- Utilize tools to automate infrastructure through scripting and model-driven programmability

Outline

Module 9: Practicing Modern Software Development	Lecture
Module 10: Describing Software Development Process	Lecture
Module 11 : Designing Software	Lecture
Module 12: Introducing Network-Based APIs	Lecture
Module 13: Consuming REST-Based APIs	Lecture

Module 14: Employing Programmability on Cisco Platforms	Lecture
Module 15: Introducing Cisco Platforms	Lecture
Module 16: Describing IP Networks (ELT only)	Lecture
Module 17: Relating Network and Applications	Lecture
Module 18 : Employing Model-Driven Programmability with YANG	Lecture
Module 19: Deploying Applications	Lecture
Module 20: Testing and Securing Applications	Lecture
Module 21: Automating Infrastructure	

Lab outline

- Parse API Data Formats with Python
- Use Git for Version Control
- Identify Software Architecture and Design Patterns on a Diagram
- Implement Singleton Pattern and Abstraction-Based Method
- Inspect HTTP Protocol Messages
- Use Postman
- Troubleshoot an HTTP Error Response
- Utilize APIs with Python
- Use the Cisco Controller APIs
- Use the Cisco Webex Teams™ Collaboration API
- Interpret a Basic Network Topology Diagram
- Identify the Cause of Application Connectivity Issues
- Perform Basic Network Configuration (NETCONF) Operations
- Use Cisco Software Development Kit (SDK) and Python for Automation Scripting
- Utilize Bash Commands for Local Development
- Construct Infrastructure Automation Workflow
- Construct a Python Unit Test
- Interpret a Dockerfile
- Utilize Docker Commands to Manage Local Developer Environment
- Exploit Insufficient Parameter Sanitization