

Faculty: FACULTY OF TELECOMMUNICATIONS AND MANAGEMENT
Department: INFORMATION TECHNOLOGIES
Professional Field: 5.3 COMMUNICATION AND COMPUTER TECHNOLOGY
Specialty: COMMUNICATION NETWORKS AND CYBERCRIME INVESTIGATION
Educational-qualification degree: MASTER

LEARNING COURSE DESCRIPTION

1.Course title: Python automation in SDN

2.Course code: M.06.021.2

3.Type of the course: Elective

4.Level: Master

5.Year of study: second

6.Semester: third

7.Number of credits: 3

8.Name of the lecturer: Assoc. Prof. Dr. Eng. Pavlinka Radoyska

9.Course learning outcomes:

The aim of the course is students to get acquainted with fundamentals of Python and the TCP/IP suite, using Python to control Cisco, Juniper, and Arista networks and to construct a Python-based migration plan from a legacy to scalable SDN-based network.

Students completed their training in the discipline

Basic knowledge of Python for network automation, DevOps, and SDN.

Practical skills for

- Using Python to execute commands when the device does not support the API or programmatic interaction with the device;
- Implementing automation techniques by integrating Python with Cisco, Juniper, and Arista eAPI;
- Integrating Ansible using Python to control Cisco, Juniper, and Arista networks;
- Achieve network security with Python;
- Building Flask-based web-service APIs with Python;
- Constructing a Python-based migration plan from a legacy to scalable SDN-based network.

Competences: After completing the course the students will be able to:

- Explain main principles of SDN-based network;
- Explain how to use Python for automation in SDN;
- Use Python to execute commands to the devices;
- Implement automation techniques by integrating Python with Cisco, Juniper, and Arista eAPI;
- Integrate Ansible using Python to control Cisco, Juniper, and Arista networks;
- Achieve network security with Python;
- Building Flask-based web-service APIs with Python..

11. Prerequisites:

Basics knowledge of Computer networks, Python programming, Operating systems, Linux and Windows, Encryption algorithms.

12. Course contents:

Review of TCP / IP Protocol Suite and Python Language. Low Level Network Device Interactions. API and Intent-Driven Networking. Python Automation Framework - Ansible Basics. Advance Python Automation Framework - Ansible Advanced Topics. Network Security with Python. Network Monitoring with Python. Building Network Web Services with Python. OpenFlow Basics. Advanced OpenFlow Topics. OpenStack, OpenDaylight and NFV. Hybrid SDN.

13. Bibliography

Basic literature:

1. Eric Chou, Mastering Python Networking: Your one stop solution to using Python for network automation, DevOps, and SDN, 1st Edition, ISBN-10 : 1784397008, ISBN-13 : 978-1784397005, Packt Publishing, 2017
2. Eric Chou, Mastering Python Networking: Your one stop solution to using Python for network automation, DevOps, and SDN, 3rd Edition, ISBN-10 : 1839214678, ISBN-13 : 978-1839214677, Packt Publishing, 2020

3. Alan Grid, Coding for Absolute Beginners and Cybersecurity: 5 BOOKS IN 1 THE PROGRAMMING BIBLE: Learn Well the Fundamental Functions of Python, Java, C++ and How to Protect Your Data from Hacker Attacks, ISBN-13 : 979-8517253934, Independently published, 2021
4. Network Automation using Python Programming, <https://www.sevenmentor.com/network-automation-using-python-programming>, 2021
5. Net DevOps: Cisco Python, Automation, NETCONF, SDN, Docker, udemy, free course, <https://www.udemy.com/course/net-devops-cisco-python-automation-netconf-sdn-docker/>

14. Assessment methods and criteria:

The course ends with final exam. The weight for the ongoing tests is 25% per test and the weight of final exam is 50%.

15. Language of instruction: English