

NHẬP MÔN DEVOPS (INTRODUCTION TO DEVOPS)

Đề cương chi tiết (Course Syllabus)

1. General Information

Course name: Nhập môn DevOps (Introduction to DevOps)

Course code: SEC1412_CLC

Course type: Selective

Number of credits: 3

2. Objectives

Knowledge:

The course provides students with the core principles and benefits of DevOps and the key tools and technologies used in DevOps environments. Also, the course provides essential knowledge on continuous integration and continuous deployment (CI/CD) pipelines; DevOps architectures; and secure development practices.

Skills:

On successful completion of this course a student will be able to:

- Identify critical requirements of DevOps environment.
- Apply the key tools and technologies to enhance security, efficiency and quality in different phases of DevOps.

Attitude:

Students are required to attend the classes and complete assignments/projects.

3. Abstracts

This course will introduce learners to the essential concepts and practices of DevOps, preparing learners for future roles in the tech industry. In particular, the course provides learners with the key tools and technologies used in DevOps environments, to gain hands-on experience with continuous integration and continuous deployment (CI/CD) pipelines; DevOps architectures; and secure development practices.

4. Teaching and learning methods

Lectures: 24h

Exercises: 5h

Projects: 8h

Labs: 8h

Individual reading: 0h

5. Prerequisites: Fundamentals of Information Security - SEC1401_CLC

6. Learning outcomes

After completing this course, the student is able to:

[CLO1] Identify requirements that integrate software development and IT operations.

[CLO2] Describe and select appropriate tools and techniques to enhance security, efficiency and quality in different phases of DevOps.

7. Assignment criteria

Learning outcomes	Assignment criteria
[CLO1] Identify requirements that integrate software development and IT operations.	Chapter 1, Chapter 2, Chapter 6,
[CLO2] Describe and select appropriate tools and techniques to enhance collaboration, efficiency, and software quality in different phases of DevOps.	Chapter 3, Chapter 4, Chapter 5, Chapter 6

8. Outlines

Chapter 1 Introduction

- 1.1. What is DevOps?
- 1.2. DevOps Principles and Culture
- 1.3. DevOps Lifecycle
- 1.4. Benefits of DevOps

Chapter 2 Security in DevOps

- 2.1. Principles
- 2.2. Security Best Practices
- 2.3. Vulnerability Management
- 2.4. Compliance and Governance

Chapter 3 Containerization and Cloud Computing

- 3.1. Docker Basics
- 3.2. Cloud Computing
- 3.3. Virtual Machines vs. Containers
- 3.4. Serverless Computing

Chapter 4 Continuous Integration and deployment

- 4.1. Continuous Integration (CI)
- 4.2. CI Setup and Configuration
- 4.3. Automated Builds and Testing
- 4.4. Deployment Pipeline
- 4.5. Monitoring and Logging

Chapter 5 Design options

- 5.1. Introduction
- 5.2. Service oriented Architecture
- 5.3. Micro-service Architecture
- 5.4. Micro-service Qualities

Chapter 6 Secure development

- 6.1. What to protect
- 6.2. Vulnerability Discovery and Patching
- 6.3. Authentication and Authorization
- 6.4. DevSecOps

9. Required Textbooks

- [1] Len Bass, John Klein, Deployment and Operations for Software Engineers: A DevOps Engineering, ISBN 1096269600, 2019

10. Suggested Textbooks

- [2] Loren Kohnfelder, Designing Secure Software: A Guide for Developers, No Starch Press, 2021, 312 pages
- [3] Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, and Nancy R. Mead, Software Security Engineering: A Guide for Project Managers, Addison Wesley Publishers, 2008

11. Schedule

Main contents	Duration	Specific contents
Chapter 1 Introduction	3h lecture	<ul style="list-style-type: none"> - What is DevOps? - DevOps Principles and Culture - DevOps Lifecycle - Benefits of DevOps
Chapter 2 Security in DevOps	4h lecture 1h exercise	<ul style="list-style-type: none"> - Principles - Security Best Practices - Vulnerability Management - Compliance and Governance
Chapter 3 Containerization and Cloud Computing	4h lecture 2h exercise 3h project 3h lab	<ul style="list-style-type: none"> - Docker Basics - Cloud Computing - Virtual Machines vs. Containers - Serverless Computing
Chapter 4 Continuous Integration and deployment	6h lecture 1h exercise 3h project 3h lab	<ul style="list-style-type: none"> - Continuous Integration (CI) - CI Setup and Configuration - Automated Builds and Testing - Deployment Pipeline - Monitoring and Logging
Chapter 5 Design options	4h lecture 1h exercise 2h project 2h lab	<ul style="list-style-type: none"> - Introduction - Service oriented Architecture - Micro-service Architecture - Micro-service Qualities

Chapter 6 Secure development	3h lecture	<ul style="list-style-type: none">- What to protect- Vulnerability Discovery and Patching- Authentication and Authorization- DevSecOps
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12. Grading Policy

Attendance:	10%
Mid-term exam/exercises:	10%
Course projects:	30%
Final examination:	50%