Module title DevOps Principles and Practices			
Module code Tbd.	**Level** Bachelor (B.Sc.)	**ECTS credits** 5	**Duration** 2 weeks block course
Module instructor Abhijit Sen, Kwantlen Polytechnic University	**Lecture type** Lectures + Tutorial Sessions	**Prerequisite(s)** Knowledge of any programming language	**Grading** Tbd.

Objectives
This course will cover fundamental concepts, theory, methodologies, and techniques of DevOps. Students will learn principles of DevOps Software Development Lifecycle, and use various DevOps tools and frameworks designed to support real life deployment.

Course Outcomes. By the end of the course, students will be able to:
Knowledge & Understanding: a) Demonstrate an understanding of the principles and practices of DevOps; b) Apply the key concepts of the DevOps to practical situations; c) Discuss DevOps capabilities and suggest adoption paths; d) Use various DevOps tools to support real life deployment; e) Implement steps for building a DevOps environment; f) Implement security for DevOps

Skills & Abilities: a) Setup a tool chains for DevOps using open source technologies; b) Apply these tool chains to project environment; c) Evaluate various DevOps models.

Classes for the course will consist of series of lectures, tutorials, in class examples, assignments, projects, and seminar presentation. The lectures will serve to introduce topics. However, there will be a strong focus on reading, appraisal and assimilation of appropriate materials to provide further detail and context. Students are advised to read relevant papers, as they will help in the assignment, and provide additional information.

This course includes a required technical term project. The purpose of this project is to select industry standard open source tool chains that can be used in a mini software development project covering all stages of DevOps Life cycle. The students will learn and demonstrate use of these tools in their selected project.

The assignments, seminar and project will be evaluated and graded.

Content

1. **Introduction to DevOps**
   - 1.1. DevOps principles, culture, challenges
   - 1.2. Essential DevOps concepts
   - 1.3. DevOps Ecosystems
   - 1.4. DevOps Lifecycle phases
   - 1.5. DevOps Trends
2. **DevOps Tools Chain**
   - 2.1. Introduction to DevOps Tools Chain
   - 2.2. How to build DevOps Tools Chain?
   - 2.3. Required Tools for Tools Chain for DevOps stages
   - 2.4. Sample Tools Chain for DevOps Stages
3. **Automatic Source Code Management**
   - 3.1. Introduction to Version Control Systems
   - 3.2. Benefits of Automatic Source Code Management
   - 3.3. Technical Features of Version Control Systems
   - 3.4. Advanced Features of Version Control Systems
   - 3.5. Comparisons of different Version Control Tools
4. Test Automation
   - 4.1. Why Automate tests?
   - 4.2. How Continuous Testing Facilitates Continuous Delivery?
   - 4.3. Various Test points in DevOps Lifecycle
   - 4.4. Sample tool sets for different DevOps stages

4.5. Comparison of Different DevOps Testing Tools
4.6. What to Automate?

5. **Continuous Integration /Monitoring**
   5.1. What is Continuous Integration?
   5.2. Role of Monitoring in Continuous Integration
   5.3. Continuous Integration and Monitoring Tools

6. **Continuous Deployment**
   6.1. What is Continuous Deployment?
   6.2. Continuous Deployment Release pipeline
   6.3. Typical Continuous Deployment Environment
   6.4. Continuous Delivery Vs Continuous Deployment
   6.5. Continuous Deployment Tools
   6.6. Periodic Table of Tools

7. **Containerization, Microservices**
   7.1. Introduction to Containers
   7.2. Container Life Cycle
   7.3. Container types: Process Container, Machine Container, Mixed Container
   7.4. Difference between Virtual Machine and Containers
   7.5. Containerization with Docker, Kubernetes
   7.6. Managing, Running Containers
   7.7. What is the future of container deployment?
   7.8. Characteristics of Microservices
   7.9. Microservices & DevOps

8. **Orchestration tools**
   8.1. Introduction to Orchestration
   8.2. Difference between Automation and Orchestration
   8.3. Orchestration Tools

Textbook/teaching material

- Course notes

Note: this is not the official course descriptor according to the “Studien- und Prüfungsordnung” (SPO)