Module Description, available in: EN

Cloud Computing for Advanced

General Information

Number of ECTS Credits

3

Module code

TSM_ClComp

Valid for academic year

2025-26

Last modification

2020-02-10

Coordinator of the module

Thomas Michael Bohnert (ZHAW, thomasmichael.bohnert@zhaw.ch)

Explanations regarding the language definitions for each location:

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Lausanne			Lugano	Zurich		
Instruction					**X** E 100%		
Documentation					**X** E 100%		
Examination					**X** E 100%		

Module Category

TSM Technical scientific module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

Basic understanding of software and systems engineering, basic usage of Linux, communication technologies/networking.

Brief course description of module objectives and content

Lecture on advanced topics in the domain of Cloud Computing, more precisely covering fundamental concepts, economics, application, operation, development of and for IaaS, PaaS, as well as their application for DevOps and Cloud-Native Applications

Aims, content, methods

Learning objectives and competencies to be acquired

- Conceptual understanding of the principles and architectural design of IaaS and PaaS services, as well as concrete implementations/frameworks.
- Ability to operate and use IaaS-frameworks.
- Ability to operate and use PaaS-frameworks.
- Understanding of Infrastructure as Code and IaaS and PaaS management APIs.
- Ability to design services and service-oriented applications natively for the cloud.
- Ability to leverage features of the cloud, that is on-demand, self-service, elasticity, multi-tenancy, metered service, broadband network access.
- Ability to evaluate the economic, legal and technological advantages of cloud as well as inherent limitations.

Module content with weighting of different components

- Definitions, Motivation, Economics, Principles, Service and Deployment Models, DC Architectures
- Example Application of IaaS (OpenStack)
- Cluster Management - IaaS Resource Orchestration by Example of OpenStack
- Cluster Management - Container Orchestration by Example of Kubernetes
- Virtualization of Compute Resources / Hypervisors
- Virtualization of Compute Resources / Containers
- Virtualization of Networking Resources / Cloud Networking
- Virtualization of Storage Resources / Basic Concepts, Block, File and Object Storage Services
- Infrastructure as Code, Gitops, Declarative State
- Basic Concepts, Architecture of a PAAS, Deployments / Blue--Green, Continuous Deployment., Tools, ArgoCD
- System Design, Resilient Architectures
- Serverless Computing
- Cloud Native Architecture
- Operating Models / Monitoring, Logging, Tracing
- Operations / Rating, Charging, Billing, Product and Service Selection, Economics, Cloud-Financial Management

Teaching and learning methods

2 Lectures, 1 tutorial session per week
Self-study based on lecture material and literature (papers, books)

Literature

Assessment

Additional performance assessment during the semester

The module does not contain an additional performance assessment during the semester

Basic principle for exams

As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.

Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

No electronic aids permitted

Other permissible aids

1A4-sheet (double-sided) of hand-written notes, English dictionary

Exception: In case of an electronic Moodle exam, adjustments to the permissible aids may occur. Lecturers will announce the final permissible aids prior to the exam session.

Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

No aids permitted