Valid from 2026.HS

Module description: Operating Systems and Infrastructure

Module Code	t.BA.DS.OSI.20HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	InIT
Module Coordinator	Josef Spillner
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3f 2 asynchronous lessons per semester week for each yearly starting-class + 2 weekly lab lessons per semester week in half-class groups
Module Description	Efficient use of data and computationally-intensive applications requires basic operating system concepts to be understood. Operating systems also provide many tools for basic data processing and automation through shell scripts. Students use remote virtualised infrastructure and services for data processing, creating and linking data science services to run data- or computationally-intensive applications.
Module Content	**Operating systems and tools:** **Basic concepts of modern operating systems (especially resource management, process management and file system)** **How to work with the operating system shell. Using operating system tools, implementing pipelines and simple shell scripts to automate data processing tasks.** **Principles of hardware and operating system virtualization and their application in data processing. Using virtual machines and containers on the local computer and in the data-centre.** **Interaction between programming language and operating system.** **Infrastructure for data- and computing-intensive applications:** **Version control, data integration and workflows.** **Cloud computing as well as cloud services for data processing.** **Usage of cloud services to create data processing workflows (event-based processing, pipelines, DataOps/MLOps, ...)** **Automated provisioning of data processing services as well as reproducibility of the processing.**
Prerequisite Knowledge	Python programming (XXI.PROG1 & 2)

Module description: Operating Systems and Infrastructure

Learning Objectives (Competencies)

Students...	Competencies	Taxonomies
You know the different operating models for infrastructure and data processing services and can decide which are most suitable for your application.	M, F	K3
You can build cloud infrastructure and services automated and utilize them for data processing.	M, F	K3
You are able to use the shell and tools of the operating system to process data and automate processes.	M, F	K3
You understand basic concepts of modern operating systems.	F, M	K2
You understand the virtualization and runtime mechanisms of operating systems and can apply them in practice.	F, M	K3

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
written exam	Grade	90	80%	acc. to module agreement	

	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
scored labs *Graded assignments during teaching semester: Control questions in the form of challenges and one project*			20%	acc. to module agreement	

Classroom Attendance Requirement

None

Learning material

- Spillner, J. (2023). Operating systems and infrastructure in data science. Zürich: vdf. ISBN 978-3-7281-4167-5.
- Switch OER: https://oer-repository.switch.ch/edu-sharing/components/collections?q=operating%20systems&id=4e0db87b-ebad-4cc9-98fa-1422d38cad6e