Module	**Advanced Data Architectures**
Code	V5_11
Degree Program	Master of Science in Life Sciences (MSLS)
ECTS Credits	3
Workload	90: 45h Lectures and Exercises, 45h Self-Study
Module Coordinator	**Name** Dr. Robert Vorburger **Phone** +41 (0)58 934 57 44 **Email** robert.vorburger@zhaw.ch **Address** ZHAW Zurich University of Applied Sciences Life Sciences and Facility Management Schloss 1 CH-8820 Wädenswil
Lecturers	Dr. Robert Vorburger, Adrian Busin
Entry Requirements	The course “Relational Databases” or equivalent
Learning Outcomes and Competences	While knowledge is usually engineered using statistical methods, the basis is always a well-structured set of data Well, not always… sometimes we must deal with unstructured data, and that is good so. This module covers the techniques and structures used to efficiently create, read, update, and delete (CRUD) unstructured data in so-called NoSQL databases. By completing the module, students will specifically acquire knowledge and skills in the following fields: • Different types of databases and their concepts • NoSQL database concepts • Distributed File Systems • Document-based Databases • Markup Languages such as XML, JSON, and YAML • Graph-based databases • The semantic web Hands-on exercises and examples will strengthen the student’s competences in applying database concepts in the fields of life sciences.

Module Content	• –NoSQL concepts
	  ○ Distributed File Systems
	  ○ Data Lakes (the new data warehouses)
	• Database types
	  ○ Key-Value-based
	  ○ Document-based such as MongoDB
	  ○ Graph-based such as RDF and Neo4j

	• Markdown Languages
	  ○ XML
	  ○ JSON
	  ○ YAML
	• Query Languages
	  ○ Cypher
	  ○ SPARQL

Teaching / Learning Methods	• Lectures : ~40% classical teaching / ~30% guided exercises • Self-Study : ~20% exercises / ~10% literature studying
Assessment of Learning Outcome	Written exam (100%)
Bibliography	Important additional literature will be provided on Moodle.
Language	English
Comments	Data [ˈdeɪtə]: Borrowing from Latin *data*, nominative plural of *datum* (“that is given”), neuter past participle of dō (“I give”).
Last Update	24.02.2025