

**Module Description, available in: EN**

## *Advanced Data Management – non standard database systems*

### General Information

**Number of ECTS Credits**

3

**Module code**

TSM\_AdvDataMgmt

**Valid for academic year**

2019-2020

**Last modification**

2018-11-06

**Responsible of module**

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**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.

	Berne	Lausanne	Lugano	Zurich
<b>Instruction</b>			X E 100%	
<b>Documentation</b>			X E 100%	
<b>Examination</b>			X E 100%	

**Module Category**

TSM Technical/scientific specialization module

**Lessons**

2 lecture periods and 1 tutorial period per week

### Entry level competences

**Prerequisites, previous knowledge**

- Database design
- Relational Model
- Normalization
- SQL
- Object relational database systems
- Object-oriented programming languages

## Brief course description of module objectives and content

The course covers the following core topics:

- Distributed and parallel database systems architectures, internals and services such as transaction processing, concurrency control and query processing
- No-SQL Systems
- Data processing architectures

## Aims, content, methods

### Learning objectives and acquired competencies

Students understand how to use database technologies to process and manage large data collections.

- They know databases alternatives beyond Relational and Object Relational systems and are able to decide which database system is appropriate depending on the context, and depending on the kind of data available
- They can design and implement Systems based on different architectures
- They understand the functioning of internal components of a database system
- They can reuse the material acquired in this course in their own working environment and apply them to solve their specific problems
- They know the actual research directions of these domains.

### Contents of module with emphasis on teaching content

Contents:

The module is organised around the following core subject areas:

- Parallel databases
- Distributed databases
- No-SQL databases
- DLT and Blockchain

Schedule:

- Parallel architectures
- Serializability
- Distributed architectures
- Replication
- CAP
- Distributed Consensus
- Eventual consistency
- DLT and Blockchain
- Hadoop and MapReduce
- Data processing with Spark
- Stream processing
- Document systems
- Graph systems
- Key value systems
- Column family stores

### Teaching and learning methods

Lectures with integrated exercises and case studies

### Literature

Lecture slides, references to internet resources and books

## Assessment

### Certification requirements

Module uses certification requirements

### Certification requirements for final examinations (conditions for attestation)

The successful delivery of solved exercises is condition for entering the examination, but will not contribute to final mark.

### Basic principle for exams

**As a rule, all the standard final exams for modules and also all repetition exams are to be in written form**

### Standard final exam for a module and written repetition exam

Kind of exam

written

**Duration of exam**

120 minutes

**Permissible aids**

No aids permitted

**Special case: Repetition exam as oral exam**

**Kind of exam**

oral

**Duration of exam**

30 minutes

**Permissible aids**

No aids permitted