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Cloud computing and big data (3IN1041)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Bachelor en science des données	**Cours: 2 ph** **Exercice: 2 ph**	**Voir ci-dessous**	6

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Printemps

Equipe enseignante

Pr Valerio Schiavoni
Hortence Yiepnou

Contenu

This 14-week course on Cloud Computing and Big Data offers both a theoretical foundation (Weeks 1–8) and hands-on practice via lab sessions and a project (Weeks 9–13).
The project constitutes 50% of the final grade, reflecting the course's strong emphasis on practical, industry-relevant skills.

Tentative schedule:
Foundational Cloud Concepts (Weeks 1–2)
Students learn about cloud deployment models (public, private, hybrid) and service models (IaaS, PaaS, SaaS), along with the basics of virtualization and resource management.
Key cloud providers (AWS, Azure, Google Cloud) are introduced with attention to scalability, elasticity, and cost-optimization.

Cloud Storage & Big Data Basics (Weeks 3–4)
Focus on object, block, and file storage services, as well as data lakes and data warehouses.
Introduction to the Hadoop ecosystem (HDFS, MapReduce, YARN) for large-scale data processing.

Real-Time Data & Advanced Processing (Weeks 5–6)
Covers streaming frameworks (Apache Kafka) and real-time data pipelines.
Dives into Apache Spark for distributed data analytics, performance tuning, and transformations on big datasets.

Containers & Advanced Big Data (Weeks 7–8)
Explores Docker containerization and Kubernetes orchestration.
Delves into large-scale machine learning, data warehousing solutions (Redshift, BigQuery), and pipeline orchestration tools.

Project-Focused Learning (Weeks 9–13)
Students undertake a comprehensive project incorporating cloud infrastructures and big data processing.
Emphasis is on architecture design, efficient deployment, and data-driven solutions.
Deliverables might include a functional prototype, cost analysis, and performance metrics (to be discussed with teacher and TA).

Forme de l'évaluation

Control continue, based on several elements during the semester:

Final Project: 50%
Practical Lab Work: 20%
Participation / Quizzes: 10%
Written Test: 20%

Modalités de rattrapage

Oral exam.

Documentation

Slides provided by the teacher
Online resources.

URLs	1) https://moodle.unine.ch/course/view.php?id=11875

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The course does not follow a specific book. However, several books are available for deeper exploration of the topics presented in this course.
If you really want a printed book, you can read this:

"Cloud Computing: Concepts, Technology & Architecture." Authors: Thomas Erl et al.

Forme de l'enseignement

Frontal lecture, practical labs, interactive sessions.

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