esade

TEACHING GUIDE - 2025-2026

Cloud Solutions

UGRA_015034

Departments	Data, Analytics, Technology and Artificial Intelligence (DATA), Dept. of Operations, Innovation & Data Sciences
Teaching Languages	English
ECTS	6
Teacher responsible	René Serral Gracià - rene.serral@esade.edu

Course Goals

After the course the studen will be able to:

- Deploy, configure and maintain typical data driven architectures in the cloud.
- Determine the best cloud provider for a given task.
- Provide a scalable cloud deployment able to cope with real-world requirements for data analysis.
- Automate infrastructure deployment in cloud environments

Previous knowledge

Students should possess a foundational understanding of computer systems, encompassing hardware and software concepts, alongside familiarity with operating systems like Windows, Linux, or macOS.
Programming knowledge is recommended but not required, as the course will not focus on development per se, however, such knoledge should prove useful for some assignments that will require automated infrastructure deployment.
Medium to advanced knowledge of microservices architectures, container management.

Prerequisits

This course will be managed through a dedicated eCampus website. Students will find there all the necessary materials, assigned readings and pre-class work, class materials, cloud provider accounts and further references.
It is recommended that the student is familiar with IDEs such as Visual Studio Code to better perform the infrastructure deployment exercises, no particular IDE will be enforced but some suggestions will be made during the course to speed-up the development.

Teaching methodology

This course is taught in a in-person format over 12 weeks, consisting of 24 sessions delivered on-campus.
A core objective of the course is to help you develop as an autonomous learner. You are expected to take ownership of your learning from the very beginning by identifying your needs and managing your time and effort accordingly. To support this, the course follows an active learning

methodology. But at the end you are the sole responsible of performing the tasks and asking all the doubts and concerns the subject may arise.
All sessions will be interactive, and you are expected to come prepared and contribute actively, questions and challenges will be presented at class, and you are expected to contribute. Consider that passive attendance will limit both you and your peers.
It is recommended that you check the documentation before coming to class, even if the teacher will stress the most important parts of the curriculum and will answer as many questions as necessary, it is important to notice that a lot of new and uncommon concepts will be introduced, coming prepared may help you complement what you learned on your own with the more detailed explanation you will receive at class. Prepare to devote 45 minutes before class and another 45 minutes after to understand the concepts in sufficient depth.
The subject will be gradually introducing new concepts, which in many cases will build upon already discussed material, so, it is very much recommended to pay attention and prepare the materials as we follow the lectures.
It is very important to understand that given the practical nature of this subject plenty of classes will have live demos, exercises and active problem solution by the students. Related to this, practical assignments will be provided to complement the demos and the theoretical lectures, such assignments will use real cloud provider accounts to practice.
To complement the learning experience real-world problems will be presented in class, moreover, some assignments will challenge you in those situations where you will be expected to provide a competitive, efficient and working solution. This will reinforce the importance of having a controlled cloud infrastructure in your future deployments. Since automation is key in this environment, it is expected that you are able to automate all the required tasks by the end of the course, rather than manually deploying the infrastructure.
The course includes an optional mid-term exam and a mandatory final exam. The mid-term provides an opportunity to assess your progress midway through the course. No make-up mid-terms will be offered, and low performance on the mid-term will not lower your final grade. Instead, it will serve both as a diagnostic tool, and to have a potential partial good mark for the final. In any case it will help you identify areas for improvement. The final exam will be comprehensive and represent a significant part of your overall assessment.
During the course there will be group assignments, where you are expected to share the burden of the exercise, if deemed necessary such assignments will be presented in front of the whole class.

Description

Course

Data analytics requires a huge amount of computational power to analyze the existing data. In this context, an on-premise deployment tends to be very

contribution to program

expensive to build (CAPEX) and even more expensive to maintain (OPEX). As a consequence, a very common practice nowadays, specially with new deployments is to just build the solution on an already existing infrastructure. To this end the most important hyperscalars, e.g., Amazon Web Services, Microsoft Azure or Google Cloud Platform, provide a very easy to use and highly scalable system that allows to build such solutions.
This course will bridge the gap between on-premise hard to configure and maintain infrastructure, and the cloud, where a pool of virtually limitless resources resides that will greatly reduce the time to market of our data analytics and machine learning platforms solutions.

Short description

In this course, students will explore the foundational concepts of cloud computing, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). The course will present the different components of a cloud solution, such as, storage, security, networking, data processing, providing a holistic view of the cloud's architecture. Students will understand how selecting the proper services impact on the result of the application. They will learn data processing techniques using cloud architectures such as AWS and Azure (using native components for each considered hyperscalar). The course covers advanced networking principles within cloud environments, including network topologies, load balancing, and service discovery, along with essential cybersecurity concepts for cloud systems such as authentication, encryption, and access control. Students will learn to leverage these cloud providers to build scalable, reliable, automatically deployed and secure solutions. The course also explores various cloud deployment models—public, private, and hybrid clouds—enabling students to determine the optimal approach for different organizational needs and requirements.

Content

#	Topic
1	Introduction to Cloud: This lesson will introduce the student to cloud infrastructure, detailing the rationale behind this outstanding technology, explaining general concepts with an overview to the different hyperscalars
2	Preliminary concepts: This chapter will align the student with important preliminary concepts that are not exclusive of cloud but that they are mandatory to undertand how it works. The focus will reside on advanced permission management, networking and security
3	Cloud Services: In this lesson the student will extend the preliminary concepts as they are applied to the cloud. Added to that, other core services of the cloud will also be introduced, for example, Storage, Interconnection services or computational node
4	Data processing in Cloud: Some of the services offered by the cloud providers are focused on data analysis.
5	Observability: One key aspect of any cloud deployment is to be aware when some services stop working. Observability provides the necessary internal wiring to control that everything is working as expected.
6	Automatic Infrastructure Deployment: most experienced cloud architects and experts never

#	Topic
6	use the UI or even the CLI to deploy their infrastructure. Key to this is to just code your infrastructure, providing lightning fast deployment, replicable deployment and error free infrastructure.
7	Cloud migration strategies and cost assessment: some companies never considered migrating to cloud, and when this needs to be done requires careful planning and a clear path in order to succeed.

Assessment

Tool	Assessment tool	Category	Weight %
Written and/or oral exams	Mid-term Exam	Ordinary round	20.00%
Written and/or oral exams	Final Exam: max(0.2*midterm+0.4*final, 0.6*final)	Ordinary round	40.00%
Individual or team exercises	Practical Exercises	Ordinary round	10.00%
Group project	Team project	Retake and ordinary round	30.00%
Attendance and punctuality	Attendance and punctuality	Ordinary round	0.00%
Written and/or oral exams	Retake Exam	Retake	70.00%

PROGRAMS

DBAI21-Double Degree in Business Administration and Artificial Intelligence for Business (Undergraduates: Business)

DBAI21 Year 4 (Mandatory)

DBAI23-Double Degree in Business Administration and Artificial Intelligence for Business (Undergraduates: Business)

DBAI23 Year 4 (Mandatory)