Cloud App Development and Management

Code: 44735
ECTS Credits: 6

2025/2026

Degree	Type	Year
Research and Innovation in Computer based Science and Engineering	OP	1

Contact

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

It is recommended to have a basic knowledge of programming languages like Python and basic skills of any Linux distribution.

Objectives and Contextualisation

The objectives of the module:

-Solve data analysis problems with open source tools

-Understand tool data management limitations and learn criteria to select suitable tools for a specific problem

-Learn data query methodologies related to each technology

-Use Cloud Computing providers to solve data analysis problems

-Apply a data analysis methodology to solve practical problems

By the end of the lectures and practical labs students should have enough knowledge to understand the requirements of typical large data analysis problems in industrial contexts. They should be able to pick some combination of tools and design a solution for a given large data analysis problem. This subject is oriented to develop data problem solving skills. Languages, tools and techniques are described in a data analysis context and students will solve a list of data problems applying the technology described at every chapter.

Learning Outcomes

1. CA14 (Competence) Graduates will be able to design reliable, efficient and secure data processing and storage systems, using cloud computing.
2. CA15 (Competence) Graduates will be able to develop innovative research projects in the face of new scientific and engineering challenges using cloud computing.
3. KA19 (Knowledge) Describe architectural principles in order to explain cloud-based applications and organise their services.
4. KA20 (Knowledge) Identify the main services offered by cloud computing.
5. SA24 (Skill) Develop computing systems based on cloud resources.
6. SA25 (Skill) Develop a cloud application architecture for private or public services whilst managing resources, costs and security requirements.
7. SA26 (Skill) Evaluate a prototype cloud application including its cost, resources, security and maintenance requirements over time.

Content

1-Introduction to Cloud Computing: benefits, challenges and risks.

2-Cloud Computing Models: Infrastructure / Platform / Software as a Service.

3-Virtual private cloud and node network configuration

4-Basic computation services

5-Basic storage services

6-Elasticity and scalability

7-Cost evaluation: TCO

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lab	26	1.04	
Theory	38	1.52	
Type: Autonomous			
Lab development	62	2.48	

The methodology will combine classroom work and problem solving in laboratory sessions.

Lab sessions will be scheduled at the beginning of the course and will use the same Teams space for the development of all practical labs. Students will use a local Linux environment: native, using local or remote Cloud Computing services.

Use of AI: The use of Artificial Intelligence (AI) tools is permitted in this subject as part of your work's development, provided the final submission reflects your significant analytical and reflective contribution. You must transparently identify AI-generated content, specify the tools used, and include a critical reflection on their role in your process and outcomes. Lack of proper disclosure will be treated as a violation of academic integrity, potentially resulting in grade penalties or stricter sanctions in serious cases.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Computational lab	15%	5	0.2	CA14, KA19, KA20, SA26
Conceptual test	35%	4	0.16	CA14, KA19, SA25
Elasticity lab	15%	5	0.2	CA15, SA24, SA25
Infrastructure lab	20%	5	0.2	CA14, KA20, SA24
VPC lab	15%	5	0.2	SA24, SA25, SA26

Evaluation will come out from the combination of work developed in the lab sessions.

Bibliography

A. Wittig, M. Wittig. "Amazon Web Services in Action", Manning, 2nd Edition, 2018.

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Bell, Charles; Kindahl, Mats; Thalmann, Lars. "MySQL High Availability". O'Reilly, 2010.

Chang, Fay, et al. "Bigtable: A Distributed Storage System for Structured Data." OSDI, 2006

Dewitt, David, and Jim Gray. "Parallel Database Systems: The Future of High Performance Database Processing." Communications of the ACM 35, no. 6 (1992): 85-98

Schwartz, Baron; Zaitsev, Peter; Tkachenko, Vadim; Zawodny, Jeremy D.; Lentz, Arjen; Balling, Derek J. "High Performance MySQL", O'Reilly, 2008.

Seyed M. M. "Saied" Tahaghoghi and Hugh E. Williams. Learning MySQL. O'Reilly, 2006

Nathan Haines. "Beginning Ubuntu for Windows and Mac Users". Apress 2015. *recurs electrònic a la biblioteca de la UAB*

William E. Shotts. "The Linux Command Line". Second Internet Edition. 2013. http://linuxcommand.org/tlcl.php

Dan C. Marinescu. "Cloud Computing. Theory and Practice". Morgan-Kaufmann. 2018.

R. Buyya, R. N. Calheiros, A. V. Dastjerdi. "Big data. Principles and paradigms". Morgan-Kaufmann. 2016.

Software

Students are requested to use latest version of Ubuntu Linux as VM in your computer. The student will acces to the UAB private cloud and public cloud (AWS)

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLABm) Practical laboratories (master)	1	English	second semester	afternoon
(TEm) Theory (master)	1	English	second semester	afternoon