Universitat Autònoma de Barcelona

2020/2021

Computation in Cloud Environments

Code: 104357
ECTS Credits: 6

Degree	Type	Year	Semester
2503758 Data Engineering	OB	3	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Teachers

Antonio Espinosa Morales
Pedro Luis Pons Pons

Prerequisites

This subject has no PRE-REQUIREMENTS. It is recommended to have studied the subjects of infrastructure management for data processing and software engineering.

Objectives and Contextualisation

The objective of this course is to be able to use cloud computing systems and be able to develop computer applications and manage cloud systems. That is why it is necessary to know the systems in the cloud, the technologies they use, the services they provide and it is necessary to understand how they work.

Competences

- Conceive, design and implement efficient and secure data storage systems.
- Conceive, design and implement efficient applications for the analysis and management of big data.
- Search, select and manage information and knowledge responsibly.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.

Learning Outcomes

1. Apply techniques to automate applications' response to dynamic situations (reliability, scalability, emergencies, etc.).
2. Develop applications that can process data on a large scale using batch and streaming paradigms.
3. Search, select and manage information and knowledge responsibly.

4. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.

Content

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

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

3. Public, private and hybrid clouds.

4. Federated Cloud and Cloud Architectures.

5. Usual services and APIs. Cloud management with the CLI.

6. Quality and performance control and guarantee. Scalability and high availability.

7. Security and privacy, capacity planning and error recovery

Methodology

In the development of the subject, four types of teaching activities can be distinguished:

Theoretical classes: exposition of the theoretical contents of each topic of the program. The typical structure of an exhibition class of this type will be as follows: first, an introduction will be made where the objectives of the exhibition and the contents to be discussed will be briefly presented. Next, the contents under study will be broken down, including narrative expositions, formal developments that provide the theoretical foundations, and interspersing examples that illustrate the application of the exposed contents. Finally, the teacher will present the conclusions of the contents. Throughout the course there will be ongoing subject group assessments.
Practical classes. All the topics will be accompanied by a list of exercises that the student must work to solve. In this sense, and as the student progresses and deepens her knowledge, these problems will gradually become more complex. The exercise classes will be the natural forum in which the development of practical work can be discussed in common, contributing the knowledge that the student lacks to carry it out. The mission of practical classes is to bridge the gap between theoretical classes and laboratory classes, which will promote the capacity for analysis and synthesis, critical reasoning, and that will train the student in problem solving. Those that the teacher considers of greatest interest or in which the students find it most difficult will be corrected by the teacher. Before the beginning of each list of problems, the teacher may propose a list of exercises that the students must solve.
Classes in the laboratory. The practical part of the theoretical topics will be completed with sessions in the laboratory, where the student will develop a series of programs and applied tasks and must try to solve a specific problem that he will receive at the beginning of the syllabus. Some of these exercises must be delivered to the class onthe specified dates. The practices will be developed in groups of students. The classes include several sessions in the laboratory according to the timetable of the subject, where the student will carry out the development of the exercises.
This approach to work is aimed at promoting active learning and developing the skills of organization and planning, oral and written communication, teamwork and critical reasoning. The quality of the exercises carried out, their presentation and their operation will be especially valued.

The management of the teaching of the subject will be done through the Virtual Campus (https://cv.uab.cat/), which will serve to see the materials, manage the practice groups, make the corresponding deliveries, see the notes , communicate with teachers, etc.

Activities

Title	Hours	ECTS	Learning Outcomes

Type: Directed			
Laboratori	12	0.48	1, 3, 2, 4
Lectures	20	0.8	1, 3, 2, 4
Problem Solving	9	0.36	1, 3, 2, 4
Type: Autonomous			
Autonomous study	30	1.2	1, 3, 2, 4
Labs preparation	32	1.28	1, 3, 2, 4
Problem Solving Study	20	0.8	1, 3, 2, 4

Assessment

The aim of the evaluation process is to verify that the student has achieved the knowledge and skills defined in the objectives of the subject, as well as the competencies.

Several types of activities will be evaluated independently where the weighted sum of them will give the final grade. These activities are:

1. Theory (T)
2. Resolution of laboratory practices (PL)
3. Completion of individual practical exercises (PA).

The Theory (T) part will be assessed with two individual partial tests throughout the course. The final grade of Theory will come from the weighted sum of the two controls (0.5 * Control 1 + 0.5 * Control 2). There will be a second chance to retake that part on the day we are assigned to the week of resit exams. Parts that have not been passed in the partial theory tests may be recovered. The minimum grade to pass this part is> = 4.5.

The Laboratory Practice Resolution (PL) part will be assessed as a group. It will have several deliveries. The final grade will come from the weighted sum of the deliveries. To pass the PL the minimum grade must be> = 4.5. There is only one chance (this part cannot be recovered).

The individual practical exercises (PA) will consist of working on very specific exercises and questions, some of them related to those found in laboratory practices. Given their nature and purpose, they are not recoverable.

The final grade of the course will be the weighted sum of the grades of each of the four activities. The result must be> = 5.

In case of not passing the subject, not reaching the minimum score in any of the sections (Theory or Laboratory Practices), although when doing the weighted average the final grade was equal to or higher than 5 the grade that will be put in the file will be 4.5.

In the event that the average does not reach 5, the grade that will appear in the file will be the numerical grade obtained numerically.

If the student delivers any activity, it is understood that it is presented in the subject and will be evaluated. If it does not deliver any activity, then it can be considered Not evaluable.

Granting an honorary enrollment grade is the decision of the faculty responsible for the subject. UAB regulations state that MHs can only be awarded to students who have obtained a final grade equal to or higher than 9.00. Up to 5% MHs of the total number of students enrolled can be awarded.

The dates of continuous evaluation and delivery of works will be published on the virtual campus and may be subject to possible scheduling changes for reasons of adaptation to possible incidents; these changes will always be reported to the virtual campus as it is understood that the CV is the usual mechanism for the exchange of information between teachers and students.

For each assessment activity, a place, date and time of review will be indicated in which the student will be able to review the activity with the teacher. In this context, claims may be made on the grade of the activity, which will be evaluated by the teacher responsible for the subject. If the student does not appear for this review, this activity will not be reviewed later.

Repeating students: Repeating students who have passed the laboratory practices can request the validation of this part of the subject. The rest of the assessment activities must be done in the same conditions as the other students.

Note on plagiarism:

Without prejudice to other disciplinary measures deemed appropriate, and in accordance with current academic regulations, irregularities committed by a student that may lead to a variation in the grade in an assessable activity will be graded with a zero (0). Assessment activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the course, this course will be suspended directly, without the opportunity to retake it in the same course. These irregularities include, but are not limited to:

the total or partial copy of a practice, report, or any other assessment activity;
let copy;
present group work not done entirely by group members (applied to all members, not just those who have not worked);
present as own materials prepared by a third party, even if they are translations or adaptations, and in general works with non-original and exclusive elements of the student;
have communication devices (such as mobile phones, smart watches, camera pens, etc.) accessible during individual theoretical-practical assessment tests (exams);
talk to classmates during individual theoretical-practical assessment tests (exams);
copy or attempt to copy from other students during the theoretical-practical assessment tests (exams

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam 1	30	2	0.08	1, 3, 2, 4
Exam 2	30	2	0.08	1, 3, 2, 4
Exercices Solving	10	5	0.2	1, 3, 2, 4
Labs	30	18	0.72	1, 3, 2, 4

Bibliography

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-Amazon Web Services in Action, 2E; Andreas Wittig, Michael Wittig; Manning Publications; Edición: 2nd edition (30 de septiembre de 2018); ISBN-10: 1617295116, ISBN-13: 978-1617295119

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