VNIVERSITAT DE VALÈNCIA

Course Guide
44824 Cloud Computing

COURSE DATA

Data Subject	
Code	44824
Name	Cloud Computing
Cycle	Master's degree
ECTS Credits	4.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps	1 - Infrastructure and Infrastructure Management	Obligatory

Coordination

Name	Department
GUTIERREZ AGUADO, JUAN	240 - Computer Science

SUMMARY

This course presents the cloud computing infrastructures. These are complex systems that require the coordination of different components distributed in the different nodes of the data center. It will show which are these components, how they are coordinated, what happens in the infrastructure since the user requests a certain resource until he has access to it. It will also show patterns for the development and execution of applications in this type of infrastructure. The goal is to provide a deep insight to be able to address modifications in the infrastructure or to design applications running on them.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Prior knowledge in data centers, virtualization and server-side programming is required.

OUTCOMES

2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Ability to apply acquired knowledge and solve problems in new or little-known environments within broader and multidisciplinary contexts, being able to integrate this knowledge.
- To foster, in academic and professional contexts, technological, social or cultural advancement within a society based on In knowledge and respect for: a) fundamental rights and equal opportunities between men and women; b) principles of equal opportunities and universal accessibility of persons with disabilities; and, c) the values of a culture of peace and democratic values.
- Ability to model, design, define the architecture, implement, manage, operate, and maintain applications, systems, services, networks and content in the field of Web technologies, cloud computing and mobile applications.
- Ability to analyze the storage needs that arise in an environment and to carry out the implantation of a solution in the fields of Web technologies, cloud computing and mobile applications.
- Ability to design and evaluate servers, applications and systems based on distributed computing.

- Ability to know the architecture, deploy and manage virtualization-based infrastructures and deploy applications in them.
- Ability to assess risk and security issues in systems and applications and take measures to mitigate them in the fields of Web technologies, cloud computing and mobile applications.

LEARNING OUTCOMES

- Specify and complete computer tasks that are complex, incompletely defined or unfamiliar
- Describe and explain techniques and methods applicable to their particular area of study and identify their limitations
- Organize your own work independently, demonstrating initiative and exercising personal responsibility
- Perform bibliographic searches and reviews using databases and other sources of information
- Learning and improving personal performance as the basis for lifelong learning and professional development
- Communicate effectively both verbally and through other media to a variety of audiences and preferably in a second language
- Know the different models of services in the cloud and its suppliers
- Describe essential components in a cloud computing system
- Explain how the network is managed in cloud computing systems and create topologies tailored to the needs
- Create and launch images on a cloud computing infrastructure
- Know, configure and use storage services in cloud computing infrastructures
- Understand and use application deployment patterns in cloud computing infrastructures
- Know and apply policies, technologies and controls to protect data, applications and infrastructure in the cloud.

DESCRIPTION OF CONTENTS

1. Cloud computing infrastructures and applications

The essential properties of cloud computing infrastructures and the applications that run on these infrastructures will be reviewed.
Application load patterns will be analyzed.
The service models in the cloud will be described (IaaS, PaaS, SaaS, etc)
Deployment architectures of cloud computing infrastructures will be displayed.

2. Patterns for computation, storage and networking

3. Cloud computing infrastructure analysis

The architecture and main components of a cloud computing infrastructure will be analyzed: networking, computing, authentication and authorization, creation and storage of images, templates, load balancers, etc.
The main storage types will be shown: blocks and objects.

4. Containers and services

The containers will be analyzed, the provisioning of virtual machines for the execution of containers, the definition of services defined by different containers and the service orchestrators.
Microservices will be developed and encapsulated in containes.
Container deployments will be made in virtual machines in a cloud computing infrastructure.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theoretical and practical classes	40,00	100
Development of group work	6,00	0
Study and independent work	35,00	0
Preparation of practical classes and problem	16,00	0
Resolution of online questionnaires	3,00	0
TOTAL	**100,00**	

TEACHING METHODOLOGY

- Theory class
- Problem resolution
- Project-oriented learning

EVALUATION

The assesment modalities used in this subject are:

SE1: Online assessment and/or degree of participation

SE2: Assessment of problems, works, reports and/or memories

SE6: Assessment of laboratory

SE4: Exam or face-to-face assessment

- First call:
In the first call the note will be obtained as follows:

SE1*0.2+SE2*0.3+SE6*0.3+SE4*0.2

- Second call:

The requested and undelivered works / memories / reports / code, etc. must be delivered throughout the course, and a face-to-face assessment. The weights will be the same as those of the first call.

The grading system is specified at the following link:

http://www.uv.es/uvweb/universidad/es/estudios-postgrado/informacion-administrativa-postgrado/permanencia-calificaciones/calificaciones-1285897761928.html

The applicable regulations can be found at the following link:

http://www.uv.es/uvweb/universidad/es/estudios-grado/informacion-academica-administrativa/normativas/normativas-universidad-valencia-1285850677111.html

REFERENCES

Basic

- https://docs.openstack.org/
- Cloud Computing Patterns: Fundamentals to Design, Build, and Manage Cloud Applications; Christoph Fehling, Frank Leymann, Ralph Retter, Walter Schupeck, Peter Arbitter, ISBN: 978-3-7091-1567-1 (Print) 978-3-7091-1568-8 (Online)
https://link.springer.com/book/10.1007%2F978-3-7091-1568-8
- OpenStack Cloud Computing Cookbook - Fourth Edition. By: Kevin Jackson; Cody Bunch; Egle Sigler; James Denton. Publisher: Packt Publishing Pub. Date: January 29, 2018. Print ISBN-13: 978-1-78839-876-3

http://proquest.safaribooksonline.com/9781788398763

- https://kubernetes.io/es/