COURSE DATA

Data Subject

Code	44822
Name	Data Centres and Virtualisation
Cycle	Master's degree
ECTS Credits	4.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps	School of Engineering	1	First 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
CLAVER IBORRA, JOSE MANUEL	240 - Computer Science

SUMMARY

Data centers are facilities to host servers and storage systems, interconnected by a high performance network infrastructure. The flexibility introduced by virtualization allows increasing the performance of these data centers. In this course, we analyze the trends, architectures as well as used techniques in their design, analysis and management under the point of view of virtualization.

PREVIOUS KNOWLEDGE

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Relationship to other subjects of the same degree

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

Other requirements

The same required to access the master.

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 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.

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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 infrastructure and architecture of the data centers and evaluate the different forms of interconnection of the nodes.

- Know the characteristics of the different forms of virtualization

- Use software tools to create interfaces, switches, bridges and virtual machines

- Design and implement networks to interconnect virtual and physical elements

- Describe the data plane and control plane separation in software defined networks

- To know the characteristics of protocols for the configuration of networks defined by software

- Develop controllers for software-defined networks

- Create virtual network functions

DESCRIPTION OF CONTENTS

1. Data centers

2. High availability and clustering

3. Virtualization of resources, components and services

4. Software Defined Networks

5. Network Function Virtualization

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

SE4: Exam or face-to-face assessment

SE6: Assessment of laboratory

Evaluation SE1 (10%)

 Based on participation and degree of involvement in the teaching-learning, taking into account regular attendance to the planned activities

Evaluation SE2 (20%)

 10% report / presentation of an advanced topic of the subject or presented by specialists.

 10% problems and exercises

Evaluation SE4 (30%):

 30% Final written exam. A minimum score of 40% is required.

Evaluation SE6 (40%)

 20% reports of the practical activities, answering questions of the statement itself. A minimum score of 40% is required.

 20% short questions from laboratories. A minimum of 40% of these short questions is required.

Note: In the case of 2nd call, the exam of the Theory Part counts 30%, corresponding to the partial and final of the 1st call, and a minimum grade of 40% is also required. The continuous evaluation activities will not be recoverable in the second 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

- Cloud Data Centers and Cost Modeling, Rajkumar Buyya; Caesar Wu
- Data Center Networks - Topologies, Architectures and Fault-Tolerance Characteristics, Liu, Y., Muppala, J.K., Veeraraghavan, M., Lin, D., Hamdi, M., Springer, 2013
- Cloud Networking: Understanding Cloud-based Data Center Networks, Gary Lee
- Analysis of TCP Performance in Data Center Networks, Kulkarni, Santosh, Agrawal, Prathima, Springer, 2014.