



POLITÉCNICA

INTERNATIONAL
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COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros
Informáticos

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000639 - Design of cloud computing and big data ecosystems

DEGREE PROGRAMME

10AN - Master Universitario en Ingeniería Informática

ACADEMIC YEAR & SEMESTER

2017/18 - Semester 1

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1. Description

1.1. Subject details

Name of the subject	103000639 - Design of cloud computing and big data ecosystems
No of credits	4.5 ECTS
Type	Optional
Academic year of the programme	Second year
Semester of tuition	Semester 3
Tuition period	September-January
Tuition languages	English
Degree programme	10AN - Master Universitario en Ingeniería Informática
Centre	Escuela Técnica Superior de Ingenieros Informáticos
Academic year	2017-18

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Marta Patiño Martínez (Subject coordinator)	2313	marta.patino@upm.es	Th - 11:00 - 14:00

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

2.2. Research assistants

Name and surname	Email	Faculty member in charge
Vianello ., Valerio	valerio.vianello@upm.es	Patiño Martinez, Marta
Fernandez Gallego, Rafael	r.fernandez@upm.es	Patiño Martinez, Marta

2.3. External faculty

Name and surname	Email	Institution
Ainhoa Azqueta	aazqueta@fi.upm.es	UPM

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

El plan de estudios Master Universitario en Ingeniería Informática no tiene definidas asignaturas previas recomendadas para esta asignatura.

3.2. Other recommended learning outcomes

- Java programming, concurrent programming, databases

4. Skills and learning outcomes *

4.1. Skills to be learned

CE1 - Capacidad para la integración de tecnologías, aplicaciones, servicios y sistemas propios de la Ingeniería Informática, con carácter generalista, y en contextos más amplios y multidisciplinares.

CE10 - Capacidad para comprender y poder aplicar conocimientos avanzados de computación de altas prestaciones y métodos numéricos o computacionales a problemas de ingeniería.

CE18 - Capacidad para comprender el mercado, sus hábitos y necesidades de productos o servicios tecnológicos

CE19 - Capacidad para desarrollar e implantar una solución informática en un entorno empresarial

CE4 - Capacidad para modelar, diseñar, definir la arquitectura, implantar, gestionar, operar, administrar y mantener aplicaciones, redes, sistemas, servicios y contenidos informáticos.

CE5 - Capacidad de comprender y saber aplicar el funcionamiento y organización de Internet, las tecnologías y protocolos de redes de nueva generación, los modelos de componentes, software intermediario y servicios

CE8 - Capacidad para analizar las necesidades de información que se plantean en un entorno y llevar a cabo en todas sus etapas el proceso de construcción de un sistema de información.

CE9 - Capacidad para diseñar y evaluar sistemas operativos y servidores, y aplicaciones y sistemas basados en computación distribuida.

CG10 - Conocimiento y comprensión de la informática necesaria para la creación de modelos de información, y de los sistemas y procesos complejos

4.2. Learning outcomes

RA173 - Conocer las métricas de rendimiento y escalabilidad para sistemas de gestión de datos

RA174 - Evaluar sistemas de gestión de datos

RA171 - Diseñar ecosistemas para gestión de datos en la nube y big data

RA172 - Conocer las tecnologías actuales para la gestión de datos

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

This course presents architectures for scalable distributed systems and data management systems: map-reduce, bigtable, data streaming, persistent queues

5.2. Syllabus

1. Introduction
2. Data management technologies
 - 2.1. NoSQL: key-value, graph databases, document oriented databases
 - 2.2. SQL y NewSQL: column oriented data stores
 - 2.3. Complex Event Processing/Data streaming
3. Data Streaming
4. Big Table. Dynamo
5. Diseño Ecosistemas Gestión de Datos Big Data y Cloud
6. Performance Evaluation. Benchmarks

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	Introducción Duration: 03:00 Lecture			
2	Tema 1 Duration: 03:00 Lecture			
3	Tema 1 Duration: 03:00 Lecture			
4	Tema 1 Duration: 03:00 Lecture			
5	Tema 2 Duration: 03:00 Lecture			
6	Tema 2 Duration: 02:30 Lecture			
7	Tema 3 Duration: 03:00 Lecture			Practical Assignment Group work Continuous assessment and final examination Duration: 10:00
8	Tema 3 Duration: 03:00 Lecture			
9	Tema 4 Duration: 03:00 Lecture			
10	Tema 4 Duration: 03:00 Lecture			
11	Tema 5 Duration: 03:00 Lecture			
12	Tema 5 Duration: 03:00 Lecture			Practical assignment Group work Continuous assessment and final examination Duration: 10:00

13	Tema 6 Duration: 03:00 Lecture			
14	Tema 6 Duration: 03:00 Lecture			
15	Tema 6 Duration: 03:00 Lecture			
16				
17				Exam Written test Continuous assessment and final examination Duration: 00:00

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The subject schedule is based on a previous theoretical planning of the subject plan and might go through experience some unexpected changes along throughout the academic year.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
7	Practical Assignment	Group work	Face-to-face	10:00	35%	5 / 10	
12	Practical assignment	Group work	Face-to-face	10:00	35%	5 / 10	CG10 CE1 CE4
17	Exam	Written test	Face-to-face	00:00	30%	4 / 10	

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
7	Practical Assignment	Group work	Face-to-face	10:00	35%	5 / 10	
12	Practical assignment	Group work	Face-to-face	10:00	35%	5 / 10	CG10 CE1 CE4
17	Exam	Written test	Face-to-face	00:00	30%	4 / 10	

7.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

7.2. Assessment criteria

Assignments 70%

Exam 30%

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Bibliografía	Bibliography	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence. P. Sadalage, M. Fowler. 2012.
Libro	Bibliography	Big Data Now: Current Perspectives from O'Reilly Radar. O'Reilly. 2011
libro2	Bibliography	Graph Databases. I. Robinson, J. Webber, E. Eifrem. O'Reilly. 2013
Slides	Bibliography	Slides
Papers	Bibliography	List of papers to be provided