



POLITÉCNICA

INTERNATIONAL  
CAMPUS OF  
EXCELLENCE

COORDINATION PROCESS OF  
LEARNING ACTIVITIES  
PR/CL/001



E.T.S. de Ingenieros  
Informaticos

# ANX-PR/CL/001-01

## LEARNING GUIDE

### SUBJECT

103000639 - Design Of Cloud Computing And Big Data Ecosystems

### DEGREE PROGRAMME

10AN - Master Universitario En Ingenieria Informatica

### ACADEMIC YEAR & SEMESTER

2024/25 - Semester 1

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### Learning guide

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## 1. Description

### 1.1. Subject details

|                                       |   |
|---------------------------------------|---|
| <b>Name of the subject</b>            | 103000639 - Design Of Cloud Computing And Big Data Ecosystems |
| <b>No of credits</b>                  | 4.5 ECTS  |
| <b>Type</b>                           | Optional  |
| <b>Academic year of the programme</b> | Second year   |
| <b>Semester of tuition</b>            | Semester 3  |
| <b>Tuition period</b>                 | September-January   |
| <b>Tuition languages</b>              | English   |
| <b>Degree programme</b>               | 10AN - Master Universitario en Ingenieria Informatica         |
| <b>Centre</b>                         | 10 - Escuela Tecnica Superior De Ingenieros Informaticos      |
| <b>Academic year</b>                  | 2024-25   |

## 2. Faculty

### 2.1. Faculty members with subject teaching role

| <b>Name and surname</b>                        | <b>Office/Room</b> | <b>Email</b>        | <b>Tutoring hours *</b>   |
|--|--------------------|---------------------|---|
| Tonghong Li                                    | 2312               | tonghong.li@upm.es  | M - 14:00 - 16:00<br>W - 14:00 - 16:00<br>Th - 14:00 - 16:00  |
| Marta Patiño Martinez<br>(Subject coordinator) | 2313               | marta.patino@upm.es | Tu - 12:00 - 14:00<br>Th - 10:00 - 12:00<br>Th - 14:00 - 15:00<br>Please, send an email in order to minimize waiting time |

|                       |      |                       |  |
|-----------------------|------|-----------------------|--|
| Ainhoa Azqueta Alzuaz | 2307 | ainhoa.azqueta@upm.es | Sin horario.<br>Please, send an<br>email to set the<br>date and time |
|-----------------------|------|-----------------------|--|

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

### 3. Prior knowledge recommended to take the subject

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#### 3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

#### 3.2. Other recommended learning outcomes

- Java programming, concurrent programming, databases

### 4. Skills and learning outcomes \*

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#### 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

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### 5.1. Brief description of the subject

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

## 5.2. Syllabus

1. Introduction
2. Data management technologies
3. Data Streaming
4. Big Table. Dynamo

## 6. Schedule

### 6.1. Subject schedule\*

| Week | Type 1 activities                                 | Type 2 activities | Distant / On-line | Assessment activities |
|------|---|-------------------|-------------------|-----------------------|
| 1    | <b>Introducción</b><br>Duration: 02:00<br>Lecture |                   |                   |                       |
| 2    | <b>Tema 1</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 3    | <b>Tema 1</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 4    | <b>Tema 1</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 5    | <b>Tema 2</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 6    | <b>Tema 2</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 7    | <b>Tema 3</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 8    | <b>Tema 3</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 9    | <b>Tema 4</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 10   | <b>Tema 4</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 11   | <b>Tema 5</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 12   | <b>Tema 5</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 13   | <b>Tema 6</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |
| 14   | <b>Tema 6</b><br>Duration: 02:00<br>Lecture       |                   |                   |                       |

|    |   |  |  |  |
|----|---|--|--|--|
| 15 | <b>Tema 6</b><br>Duration: 02:00<br>Lecture             |  |  |  |
| 16 |   |  |  |  |
| 17 | <b>Exam</b><br>Duration: 02:00<br>Additional activities |  |  | <b>Exam</b><br>Written test<br>Progressive assessment and Global<br>Examination<br>Presential<br>Duration: 02:00 |

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.



## 7. Activities and assessment criteria

### 7.1. Assessment activities

#### 7.1.1. Assessment

| Week | Description | Modality     | Type         | Duration | Weight | Minimum grade | Evaluated skills                  |
|------|-------------|--------------|--------------|----------|--------|---------------|-----------------------------------|
| 17   | Exam        | Written test | Face-to-face | 02:00    | 100%   | 5 / 10        | CE4<br>CE19<br>CE1<br>CE9<br>CE10 |

#### 7.1.2. Global examination

| Week | Description | Modality     | Type         | Duration | Weight | Minimum grade | Evaluated skills                  |
|------|-------------|--------------|--------------|----------|--------|---------------|-----------------------------------|
| 17   | Exam        | Written test | Face-to-face | 02:00    | 100%   | 5 / 10        | CE4<br>CE19<br>CE1<br>CE9<br>CE10 |

#### 7.1.3. Referred (re-sit) examination

| Description | Modality     | Type         | Duration | Weight | Minimum grade | Evaluated skills  |
|-------------|--------------|--------------|----------|--------|---------------|---|
| Exam        | Written test | Face-to-face | 03:00    | 100%   | 5 / 10        | CG10<br>CE5<br>CE8<br>CE4<br>CE19<br>CE10<br>CE1<br>CE9 |

## 7.2. Assessment criteria

Exam 100%

## 8. Teaching resources

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### 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   |