Degree competences to which the subject contributes

Specific:
1. CE 21 SIS. Capacidad para construir, explotar y gestionar las redes, servicios, procesos y aplicaciones de telecomunicaciones, entendidas éstas como sistemas de captación, transporte, representación, procesado, almacenamiento, gestión y presentación de información multimedia, desde el punto de vista de los sistemas de transmisión. (CIN/352/2009, BOE 20.2.2009.)
2. CE 24 TEL. Capacidad de describir, programar, validar y optimizar protocolos e interfaces de comunicación en los diferentes niveles de una arquitectura de redes. (CIN/352/2009, BOE 20.2.2009.)
3. CE 27 TEL. Capacidad de programación de servicios y aplicaciones telemáticas, en red y distribuidas. (CIN/352/2009, BOE 20.2.2009.)

General:
8. EFFICIENT USE OF EQUIPMENT AND INSTRUMENTATION - Level 3: Design experiments, measurements, subsystems and systems, equipment and tools most appropriate laboratory. Knowing not only benefits but also the limitations of the equipment and resources. Conduct assessments and evaluations critically, making decisions according to the overall system specifications or service.

Transversal:
4. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
5. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
6. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
7. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
8. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Learning objectives of the subject
After completing the course, students should be able to:
- Describe the problem of managing large amounts of data (distributed, performance, parallelization and scalability)
- Describe architectural models for managing large amounts of data
- Implement applications that manipulate large amounts of data distribution using current tools.
- List and describe the usefulness of different types of algorithms for predictive analysis in smart cities.
- Analyze the behavior of the network, users and content in smart cities using tools of data analysis and recommendation.
- Analyze the modernization of electronic electoral processes and help increase citizens' trust in e-democracy
- Describe the different data formats used in smart cities and problems related
- In the world of augmented reality, identify the sensors used, their features and map formats that can be used
- Identify the problems associated with security on smart grids
- Describe the basic aspects of an eHealth environment

### Study load

<table>
<thead>
<tr>
<th><strong>Total learning time:</strong> 150h</th>
<th>Hours large group:</th>
<th>32h 30m</th>
<th>21.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
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<td></td>
</tr>
<tr>
<td>Hours small group:</td>
<td>32h 30m</td>
<td>21.67%</td>
<td></td>
</tr>
<tr>
<td>Guided activities:</td>
<td>1h</td>
<td>0.67%</td>
<td></td>
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<tr>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
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</tbody>
</table>
# Content

## (ENG) - GESTIÓ DE DADES DISTRIBUIDES

**Learning time:** 25h  
Theory classes: 5h 30m  
Laboratory classes: 5h 30m  
Self study: 14h

**Description:**  
The problem of managing large volumes of data  
Cost, parallelization and scalability of data manipulation  
Architectural model of data manipulation: Map & Reduce  
Examples of existing tools: Apache Hadoop

## (ENG) - ALGOTÍSMES PER SMART CITIES

**Learning time:** 50h  
Theory classes: 11h  
Laboratory classes: 11h  
Self study: 28h

**Description:**  
Techniques and types of algorithms to add "intelligence" to applications.  
Examples of use of predictions and recommendations  
- Decision support systems  
- Detection of patterns  
Examples of current tools: Mahout

## (ENG) ADVANCED SERVICES FOR SMART CITIES

**Learning time:** 75h  
Theory classes: 16h 30m  
Laboratory classes: 16h 30m  
Self study: 42h

**Description:**  
The student should understand the operation / management services such as smart grids, eVoting, eHealth, fleet management, augmented reality and all kinds of services related to life in a smart city; as well as all issues of common and particular all safety. In any case the details of the contents adapted to AD project mainly chosen by the students / teachers.
### Planning of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ENG) PRÀCTICA GUIADA D'UTILITZACIÓ DE HADOOP</td>
<td>2h</td>
<td>Self study: 2h</td>
</tr>
<tr>
<td>(ENG) EXERCICI AUTÒNOM D'UTILITZACIÓ DE HADOOP</td>
<td>5h 30m</td>
<td>Laboratory classes: 2h 45m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self study: 2h 45m</td>
</tr>
<tr>
<td>(ENG) PRÀCTICA GUIADA D'UTILITZACIÓ DE MAHOUT</td>
<td>2h</td>
<td>Self study: 2h</td>
</tr>
<tr>
<td>(ENG) EXERCICI AUTÒNOM D'UTILITZACIÓ DE MAHOUT</td>
<td>11h</td>
<td>Laboratory classes: 5h 30m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self study: 5h 30m</td>
</tr>
<tr>
<td>(ENG) IMPLEMENTATION OF AN ADVANCED SERVICE FOR SMART CITIES</td>
<td>15h</td>
<td>Laboratory classes: 10h</td>
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<tr>
<td></td>
<td></td>
<td>Self study: 5h</td>
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</table>

### Bibliography

- Self study: 2h
- Laboratory classes: 2h 45m
- Self study: 2h 45m
- Self study: 2h
- Laboratory classes: 5h 30m
- Self study: 5h 30m
- Laboratory classes: 10h
- Self study: 5h