Degree competences to which the subject contributes

Basic:
CB2. That the students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of ??study.
CB3. That students have the ability to gather and interpret relevant data (usually within their area of ??study) to make judgments that include a reflection on relevant social, scientific or ethical issues.
CB5. That the students have developed those learning skills necessary to undertake later studies with a high degree of autonomy

General:
CG1. To design computer systems that integrate data of provenances and very diverse forms, create with them mathematical models, reason on these models and act accordingly, learning from experience.
CG2. Choose and apply the most appropriate methods and techniques to a problem defined by data that represents a challenge for its volume, speed, variety or heterogeneity, including computer, mathematical, statistical and signal processing methods.
CG4. Identify opportunities for innovative data-driven applications in evolving technological environments.

Transversal:
CT7. Third language. Know a third language, preferably English, with an adequate oral and written level and in line with the needs of graduates.

Teaching methodology

Planned methodology for the part of data ethics:
Each week has an associated topic. The weekly theme is presented in the first hour to the whole class by an expert and / or through material (audiovisual and / or textual). Over the next two hours, simultaneous classes are held in two subgroups (small groups), where students, in teams of 3 or 4, analyze the topic. At the end of the two hours the work of all the teams is shared. Each week there is a different team for each small group that organizes it. Then, the two teams in charge of the weekly topic have more than a week to prepare the last hour work (for the large group), which is about continuing and expanding what was done earlier in the small groups.

Learning objectives of the subject

2. Recognize and understand the social and environmental impact of data science and engineering, and the ethical issues involved in their applications.
Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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</table>

Content

Modeling and simulation.

Degree competences to which the content contributes:

Description:
System concept, model. In this point we can explain in more or less detail aspects related to how we interpret the reality and the phenomenon of experimentation and validation (positivism, empiricism, etc.). Stages in the process of Validation, Verification and Accreditation of a model: explaining the different techniques that we can apply, the hypotheses and their possible taxonomy. This brings us to the need to define conceptual models in order to properly develop the validation process. Main formal languages for defining conceptual models (SDL, DEVS, Petri Nets, SysML, BPMN, etc.). System Dynamics: Introducing Forrester’s Causal and Forrester diagrams and models related to social and environmental simulation, we present Jay Forrester’s World 03 model. Coding a discrete simulation model using a generic tool.

Data ethics

Degree competences to which the content contributes:

Description:
Development of topics related to science and data engineering based on values. Eg: welfare, privacy, freedom, equity, sustainability.
Case studies in different fields of application. Eg: advertising, teaching, work, justice, insurance, banking.
### Planning of activities

<table>
<thead>
<tr>
<th>(ENG) Aprenentatge sobre Modelat i Simulació</th>
<th>Hours: 72h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 21h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 0h</td>
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<tr>
<td></td>
<td>Laboratory classes: 8h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 43h</td>
</tr>
</tbody>
</table>

**Description:**
(ENG)

**Support materials:**
(ENG)

**Descriptions of the assignments due and their relation to the assessment:**
(ENG)

**Specific objectives:**
(ENG) 1

<table>
<thead>
<tr>
<th>Data ethics learning</th>
<th>Hours: 71h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 14h</td>
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<tr>
<td></td>
<td>Practical classes: 0h</td>
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<tr>
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<td>Laboratory classes: 14h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 43h</td>
</tr>
</tbody>
</table>

**Specific objectives:**
2

### Qualification system

The evaluation of the course will be carried out taking into account the blocks of knowledge of the syllabus: the B1 block of Modeling and simulation and the B2 block of ethics. The final grade will be calculated by a weighted average of the marks of each block:

Final grade = 0.5 B1 + 0.5 B2.

Grade B1 for the Modeling and Simulation part will be evaluated based on a practical work (written in English).

Grade B2 corresponding to the part of Data Ethics, will be evaluated taking into account:
- Class participation - 25%
- Development of a topic and presentation - 75%

The reassessment mark will be calculated as 0.5 B1 + 0.5 B2, where B1 and B2 will be the grades of the new submissions. Only students who have submitted and failed the regular assessment may be re-evaluated.
Bibliography

Basic:


