270505 - CSI - Computing and Intelligent Systems

Degree competences to which the subject contributes

Basic:
CB6. Ability to apply the acquired knowledge and capacity for solving problems in new or unknown environments within broader (or multidisciplinary) contexts related to their area of study.

Specific:
CTE7. Capability to understand and to apply advanced knowledge of high performance computing and numerical or computational methods to engineering problems.
CTE9. Capability to apply mathematical, statistical and artificial intelligence methods to model, design and develop applications, services, intelligent systems and knowledge-based systems.
CTE1. Capability to model, design, define the architecture, implement, manage, operate, administrate and maintain applications, networks, systems, services and computer contents.

Transversal:
CTR6. REASONING: Capacity for critical, logical and mathematical reasoning. Capability to solve problems in their area of study. Capacity for abstraction: the capability to create and use models that reflect real situations. Capability to design and implement simple experiments, and analyze and interpret their results. Capacity for analysis, synthesis and evaluation.

Teaching methodology
It combines lectures to introduce the fundamental concepts, the classes of problems to practice and exercise their implications with laboratory classes, where you will see a more practical all this through case study and using packages already implemented.

Learning objectives of the subject
1. Get languages for modeling and solving problems and reasoning saver and apply them to specific problems with certainty and uncertainty, using specialized tools, while being aware of the implications of complexity theory.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Theory classes: 12h</th>
<th>8.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical classes:</td>
<td>12h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>24h</td>
<td>16.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>96h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
# Content

## Knowledge representation and reasoning in the context of automatic certainty

**Degree competences to which the content contributes:**

**Description:**
Will be propositional logic. Its syntax and semantics, the basic inference algorithm and its expressive power.

## Knowledge representation and automatic reasoning with uncertainty

**Degree competences to which the content contributes:**

**Description:**
Will be the Bayesian Networks, syntax, semantics, the basic inference algorithms and their expressive power.

## Machine learning

**Degree competences to which the content contributes:**

**Description:**
Will be the most important machine learning algorithms understanding the strengths and weaknesses of each in order to know what is the most appropriate for each situation.
### Planning of activities

| **Development of the first theme of the course (propositional logic)** | **Hours**: 47h  
Theory classes: 5h  
Practical classes: 5h  
Laboratory classes: 10h  
Guided activities: 2h  
Self study: 25h |
|---|---|

**Description:**  
Assimilate the basics of propositional logic (syntax, semantics, inference) understand the expressive power of propositional logic and see examples of actual use.  

**Specific objectives:**  
1

| **2 Development of the subject matter (Bayesian networks)** | **Hours**: 43h  
Theory classes: 4h  
Practical classes: 4h  
Laboratory classes: 8h  
Guided activities: 2h  
Self study: 25h |
|---|---|

**Description:**  
Assimilate the basics of Bayesian networks (syntax, semantics, inference) Assimilate the expressive power of Bayesian networks and examples of actual use.  

**Specific objectives:**  
1

| **3 Develop the topic of the course (Machine Learning)** | **Hours**: 43h  
Theory classes: 4h  
Practical classes: 4h  
Laboratory classes: 8h  
Guided activities: 2h  
Self study: 25h |
|---|---|

**Specific objectives:**  
1

### Qualification system

The course is divided into 3 parts. Each part is evaluated with an exam and a project. All evaluations are worth 1/6 of the final grade.
Bibliography

Basic:

Complementary: