Degree competences to which the subject contributes

Basic:
CB1. That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge from the vanguard of their field of study.

Specific:
CE1. Skillfully use mathematical concepts and methods that underlie the problems of science and data engineering.

General:
CG5. To be able to draw on fundamental knowledge and sound work methodologies acquired during the studies to adapt to the new technological scenarios of the future.

Transversal:
CT5. Solvent use of information resources. Manage the acquisition, structuring, analysis and visualization of data and information in the field of specialty and critically evaluate the results of such management.
CT6. Autonomous Learning. Detect deficiencies in one’s own knowledge and overcome them through critical reflection and the choice of the best action to extend this knowledge.

Teaching methodology
In the theory classes the subject is exposed, complementing it with examples and applications. in the problem sessions we'll discuss problems from a list, encouraging the active participation of students.

Learning objectives of the subject
1. To know the language of mathematical logic
2. To understand basic arithmetic of integers and polynomials, specially the computational aspects
4. To know the basic results of enumerative combinatorics
5. To know the basics of graph theory, with emphasis on algorithmic problems

Study load

<table>
<thead>
<tr>
<th>Total learning time: 187h 30m</th>
<th>Hours large group: 45h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 30h</td>
<td>16.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 112h 30m</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
# Content

## Sets and proofs

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

**Description:**

## Propositional and predicate calculus

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

**Description:**

## Integer arithmetics and polynomials

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

**Description:**

## Basic enumeration and recurrences

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

**Description:**

## Graphs and trees

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

**Description:**

## Planarity and colouring

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

**Description:**
Planar graphs. Euler's formula. Graph colouring, algorithms.
Planning of activities

<table>
<thead>
<tr>
<th>Problem solving</th>
<th>Hours: 0h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 0h</td>
</tr>
</tbody>
</table>

Specific objectives:
1, 2, 4, 5

Qualification system

Midterm exam (40%) and final exam (60%). On the day of the final exam students have the opportunity to resit the midterm. There will be a retake exam that will substitute 100% of the original grade.

Bibliography

Basic: