Degree competences to which the subject contributes

Learning objectives of the subject

The course Mathematics addresses general formative purposes. It aims to generate learning skills and to promote the assessment of the power and usefulness of mathematical models and procedures, in order to understand and to make decisions in the techno-scientific area. Mathematics plays a fundamental role in helping to understand the techno-scientific environment and to deal with it in an autonomous and creative way. As in all the areas of mathematics, systematic and constant work, accurate reasoning and interpretation, and abstraction will be enhanced throughout the teaching-learning process. By the end of the course the student will be able to carry out logical reasoning, to develop analytical and critical thinking, to evaluate arguments rigorously and to communicate them effectively. Students will achieve fundamental concepts connected with linear algebra and geometry, and their applications to drawing, graphical expression and projects. Regarding the area of programming and applications students will use worksheets and specific programs to solve complex mathematical problems.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 40h</th>
<th>26.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group: 20h</td>
<td></td>
<td>13.33%</td>
</tr>
<tr>
<td>Self study: 90h</td>
<td></td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## 390231 - MAT - Mathematics

### Content

<table>
<thead>
<tr>
<th>Linear Algebra</th>
<th>Learning time: 36h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td>1. Matrix algebra.</td>
<td></td>
</tr>
<tr>
<td>2. Determinants.</td>
<td></td>
</tr>
<tr>
<td>4. Inequalities.</td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td>Laboratory classes: 6h</td>
</tr>
<tr>
<td>Activity 1: Lectures.</td>
<td></td>
</tr>
<tr>
<td>Activity 2: Individual written test.</td>
<td></td>
</tr>
<tr>
<td>Activity 3: Problem and exercise solving.</td>
<td></td>
</tr>
<tr>
<td>Activity 4: Computer Lab Sessions.</td>
<td></td>
</tr>
<tr>
<td>Activity 5: Questionnaires.</td>
<td></td>
</tr>
<tr>
<td><strong>Self study:</strong></td>
<td>Self study: 20h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Real functions of real variable</th>
<th>Learning time: 46h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td>1. Functions: types and graphs.</td>
<td></td>
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<tr>
<td>2. Limits and continuity.</td>
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<tr>
<td>3. Derivatives.</td>
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<tr>
<td>4. Optimization.</td>
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<tr>
<td>5. Antiderivatives.</td>
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</tr>
<tr>
<td>6. Areas and volumes.</td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td>Laboratory classes: 6h</td>
</tr>
<tr>
<td>Activity 1: Lectures.</td>
<td></td>
</tr>
<tr>
<td>Activity 2: Individual written test.</td>
<td></td>
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<tr>
<td>Activity 3: Problem and exercise solving.</td>
<td></td>
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<tr>
<td>Activity 4: Computer Lab Sessions.</td>
<td></td>
</tr>
<tr>
<td>Activity 5: Questionnaires.</td>
<td></td>
</tr>
<tr>
<td><strong>Self study:</strong></td>
<td>Self study: 30h</td>
</tr>
</tbody>
</table>
### Analytic Geometry

**Learning time:** 40h  
- Theory classes: 14h  
- Laboratory classes: 6h  
- Self study: 20h

**Description:**
2. Lines and planes in space.  
3. Incidence relations in space.  
5. Distance.  
6. Conic Sections.  
7. Quadric surfaces.

**Related activities:**
- Activity 1: Lectures.  
- Activity 2: Individual written test.  
- Activity 3: Problem and exercise solving.  
- Activity 4: Computer Lab Sessions.  
- Activity 5: Questionnaires.

### Trigonometry. Trigonometric functions

**Learning time:** 28h  
- Theory classes: 6h  
- Laboratory classes: 2h  
- Self study: 20h

**Description:**
1. Trigonometry.  
2. Trigonometric functions.  
3. Inverse trigonometric functions.  
4. Trigonometric identities.

**Related activities:**
- Activity 1: Lectures.  
- Activity 2: Individual written test.  
- Activity 3: Problem and exercise solving.  
- Activity 4: Computer Lab Sessions.  
- Activity 5: Questionnaires.
# Planning of activities

| ACTIVITY 1. LECTURES | Hours: 97h  
Theory classes: 38h  
Self study: 59h |
|----------------------|----------------------|
| **ACTIVITY 2. INDIVIDUAL WRITTEN TEST** | Hours: 2h  
Theory classes: 2h |
| **Description:**  
Midterm written exam. Final written exam. |
| **Support materials:**  
Calculator. One formulae sheet. |
| **ACTIVITY 3. EXERCISES AND PROBLEM SOLVING** | Hours: 20h  
Laboratory classes: 10h  
Self study: 10h |
| **Support materials:**  
Course material available in Atenea. |
| **ACTIVITY 4. COMPUTER LAB SESSIONS** | Hours: 15h  
Self study: 5h  
Laboratory classes: 10h |
| **Support materials:**  
Course material available in Atenea. |
| **ACTIVITY 5: QUIZZES** | Hours: 16h  
Self study: 16h |
| **Support materials:**  
Quizzes - virtual campus Atenea. |

# Qualification system

N1: The continuous assessment will be developed mainly in the context of small groups and computer lab sessions.
N2: There will be several questionnaires throughout the course.
N3: There will be a mid-semester written exam.
N4: There will be a final (global) written exam at the end of the semester.

Final Mark = 0.20 N1 + 0.05 N2 + 0.30 N3 + 0.45 N4
**Bibliography**

**Basic:**


**Complementary:**

