Course guide
200005 - GAE - Affine and Euclidean Geometry

Unit in charge: School of Mathematics and Statistics
Teaching unit: 749 - MAT - Department of Mathematics.
Degree: BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Compulsory subject).
Academic year: 2022 ECTS Credits: 7.5 Languages: Catalan

LECTURER
Coordinating lecturer: JESUS FERNANDEZ SANCHEZ
Others: Segon quadrimestre:
JOSEP ALVAREZ MONTANER - M-A
JESUS FERNANDEZ SANCHEZ - M-A, M-B
FRANCESC D'ASSIS PLANAS VILANOVA - M-B

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CE-2. Solve problems in Mathematics, through basic calculation skills, taking in account tools availability and the constraints of time and resources.
2. CE-3. Have the knowledge of specific programming languages and software.
3. CE-4. Have the ability to use computational tools as an aid to mathematical processes.

General:
4. CB-1. Demonstrate knowledge and understanding in Mathematics that is founded upon and extends that typically associated with Bachelor's level, and that provides a basis for originality in developing and applying ideas, often within a research context.
5. CB-2. Know how to apply their mathematical knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader or multidisciplinary contexts related to Mathematics.
6. CB-3. Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.
7. CG-1. Show knowledge and proficiency in the use of mathematical language.
8. CG-2. Construct rigorous proofs of some classical theorems in a variety of fields of Mathematics.
9. CG-3. Have the ability to define new mathematical objects in terms of others already know and ability to use these objects in different contexts.
10. CG-4. Translate into mathematical terms problems stated in non-mathematical language, and take advantage of this translation to solve them.
12. CG-6 Detect deficiencies in their own knowledge and pass them through critical reflection and choice of the best action to extend this knowledge.

Transversal:
11. 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.

TEACHING METHODOLOGY

(SECTION NOT AVAILABLE)

LEARNING OBJECTIVES OF THE SUBJECT

(SECTION NOT AVAILABLE)
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>30.0</td>
<td>16.00</td>
</tr>
<tr>
<td>Self study</td>
<td>105.0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>45.0</td>
<td>24.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>7,5</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Total learning time: 187.5 h

CONTENTS

1. AFFINE SPACE

Description:
Affine space, linear varieties, relative positions. Cartesian and baricentric coordinate systems. Simple ratio. Theorems of Thales, Ceva, Menelao and Desargues.

Full-or-part-time: 25h
Theory classes: 9h
Practical classes: 6h
Self study: 10h

2. AFFINE MAPS

Description:

Full-or-part-time: 29h 20m
Theory classes: 9h
Practical classes: 7h
Self study: 13h 20m

3. EUCLIDEAN GEOMETRY

Description:

Full-or-part-time: 22h 50m
Theory classes: 6h
Practical classes: 3h 30m
Self study: 13h 20m
### 4. MOVEMENTS

**Description:**
Isometries and movements. Study and classification of movements in dimension 1, 2 and 3.

**Full-or-part-time:** 16h
- Theory classes: 10h
- Practical classes: 5h
- Self study: 1h

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### 5. CONICS AND QUADRICS

**Description:**
Adapted coordinate systems. Relevant points and lines. Affine and metric classifications. Detailed study of non-degenerated conics and quadrics. Polarity. Study of affine and metric properties.

**Full-or-part-time:** 27h 20m
- Theory classes: 8h
- Practical classes: 6h
- Self study: 13h 20m

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### GRADING SYSTEM

A continuous assessment (CA) is proposed based on solving exercises and the active participation in problem resolution classes. There will be a Midterm exam (ME).

The final exam (FE) will consist of one part containing problems and a final theoretical part.

The final mark (FM) will result from: \[ FM = \max \{ 0.1 \ CA + 0.2 \ ME + 0.7 \ FE; 0.2 \ MEP + 0.8 \ FE; \ FE \} \]

An extra exam will take place on July for students that failed during the regular semester.

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### BIBLIOGRAPHY

**Basic:**

**Complementary:**