200003 - FM - Fundamentals of Mathematics

Coordinating unit: 200 - FME - School of Mathematics and Statistics
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2017
Degree: BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 7,5
Teaching languages: Catalan

Teaching staff
Coordinator: JOSE BURILLO PUIG
Others: Primer quadrimestre:
  MARIA ALBERICH CARRAMIÑANA - A
  MARIA LUZ ALBEROLA PEREZ - A, B
  GUILLEM BLANCO FERNÁNDEZ - A, B
  JOSE BURILLO PUIG - A, B
  JORDI GUARDIA RUBIES - B
  JAUME MARTI FARRE - A, B
  MERCÈ MORA GINÉ - A, B
Segon quadrimestre:
  JOSE BURILLO PUIG - REF
  MERCÈ MORA GINÉ - REF

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
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The main objective of the course is to help saving the bridge between secondary school mathematics and university mathematics by providing students the necessary foundation for developing their undergraduate studies.

This objective involves two intertwined lines. One is to make students aware of the essential role of the concept of proof in mathematics. The other one is to securely establish the basic contents related to language, numerical sets, and elements of algebra.

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

Theoretical classes essentially consist in instructor presentations, including detailed examples. In practical sessions, some problems are solved by the instructors as a model, and some others by the students.

Learning objectives of the subject

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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>Hours medium group: 0h</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>Hours small group: 30h</td>
<td></td>
<td>16.00%</td>
</tr>
<tr>
<td>Guided activities: 7h 30m</td>
<td></td>
<td>4.00%</td>
</tr>
<tr>
<td>Self study: 105h</td>
<td></td>
<td>56.00%</td>
</tr>
</tbody>
</table>
### Content

#### The language of mathematics

**Learning time:** 24h 24m  
Theory classes: 6h  
Practical classes: 4h  
Self study: 14h 24m

**Description:**

#### Numerical systems

**Learning time:** 73h 12m  
Theory classes: 18h  
Practical classes: 12h  
Self study: 43h 12m

**Description:**

#### Elements of algebra

**Learning time:** 47h 30m  
Theory classes: 15h  
Practical classes: 10h  
Self study: 22h 30m

**Description:**


### Qualification system

There will be an exam for the first part of the subject and a final exam.

The midterm exam comprises the 35% of the final score in case this mark exceeds the final exam mark, otherwise only the final exam mark shall be computed.

The resolution of some problems proposed throughout the term may represent the 10% of the final score whether this mark exceeds the mark correspondent to the exams specified above.

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

Basic:


Complementary:


