200213 - SD - Dynamical Systems

**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 Optional)  
**ECTS credits:** 6  
**Teaching languages:** Catalan

### Teaching staff

**Coordinator:** INMACULADA CONCEPCION BALDOMA BARRACA  
**Others:** Primer quadrimestre:  
INMACULADA CONCEPCION BALDOMA BARRACA - A  
PABLO MARTIN DE LA TORRE - A

### Degree competences to which the subject contributes

#### Specific:
3. CE-2. Solve problems in Mathematics, through basic calculation skills, taking in account tools availability and the constraints of time and resources.  
4. CE-4. Have the ability to use computational tools as an aid to mathematical processes.  
5. Ability to solve problems from academic, technical, financial and social fields through mathematical methods.  
13. CE-1. Propose, analyze, validate and interpret simple models of real situations, using the mathematical tools most appropriate to the goals to be achieved.  
14. CE-3. Have the knowledge of specific programming languages and software.

#### General:
1. CB-4. Have the ability to communicate their conclusions, and the knowledge and rationale underpinning these to specialist and non-specialist audiences clearly and unambiguously.  
2. To have developed those learning skills necessary to undertake further interdisciplinary studies with a high degree of autonomy in scientific disciplines in which Mathematics have a significant role.  
6. CG-1. Show knowledge and proficiency in the use of mathematical language.  
7. CG-2. Construct rigorous proofs of some classical theorems in a variety of fields of Mathematics.  
8. 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.  
9. CG-4. Translate into mathematical terms problems stated in non-mathematical language, and take advantage of this translation to solve them.  
10. 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. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.  
12. 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.
200213 - SD - Dynamical Systems

Teaching methodology

(Section not available)

Learning objectives of the subject

(Section not available)

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
# 200213 - SD - Dynamical Systems

## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time</th>
<th>Theory classes</th>
<th>Practical classes</th>
<th>Self study</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Chaotic Dynamics</td>
<td>15h</td>
<td>4h</td>
<td>2h</td>
<td>9h</td>
</tr>
<tr>
<td>- The two-body problem</td>
<td>15h</td>
<td>2h</td>
<td>4h</td>
<td>9h</td>
</tr>
<tr>
<td>- Invariants of Flows and Diffeomorphisms</td>
<td>65h</td>
<td>13h</td>
<td>13h</td>
<td>39h</td>
</tr>
<tr>
<td>- Linear Systems</td>
<td>15h</td>
<td>3h</td>
<td>3h</td>
<td>9h</td>
</tr>
<tr>
<td>- Global Dynamics</td>
<td>40h</td>
<td>8h</td>
<td>8h</td>
<td>24h</td>
</tr>
</tbody>
</table>

## Qualification system

- Final exam (F).
- Resolution of the assigned problems (written report and oral presentation). (P)
- Project: written report and oral presentation. Discussion of other students projects. (T)

Final score: \( 0.3 \times F + 0.3 \times P + 0.4 \times T \)
Bibliography

Basic:


