200201 - TG - Galois Theory

Coordinating unit: 200 - FME - School of Mathematics and Statistics
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2015
Degree: BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 6  Teaching languages: Catalan

Teaching staff
Coordinator: JORDI QUER BOSOR
Others: JORDI QUER BOSOR - A

Prior skills
Contents of Algebraic Structures: permutation groups, simple groups, Jordan-Hölder theorem, solvable groups, p-groups, polynomial rings, fields.

Requirements
The course Algebraic Structures of 3rd year.

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.

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.

**Teaching methodology**

Theory sessions where the teacher presents the contents of the course and problems sessions where the students and the professor solve the proposed problems.

**Learning objectives of the subject**

Basic concepts and results of Galois theory and its applications to the resolution by radicals of polynomial equations and to the geometric constructions with ruler and compass.

**Study load**

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

### Fields and extensions

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 50h</th>
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Laboratory classes: 10h  
Self study: 30h |

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### Applications

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<th>Description:</th>
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</tr>
</thead>
</table>
Laboratory classes: 10h  
Self study: 30h |

## Qualification system

Every student can obtain up to 5 points by solving problems in the problem sessions and giving them in written form. Moreover, there will be a final exam. The course mark will be computed as $AC + (10 - AC) \times NF/10$, with $AC$ is the mark obtained in problem sessions and $NF$ is the mark of the final exam.
Bibliography

Basic:


Complementary:


