# 200201 - TG - Galois Theory

## Coordinating unit:
200 - FME - School of Mathematics and Statistics

## Teaching unit:
749 - MAT - Department of Mathematics

## Academic year:
2018

## Degree:
BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Teaching unit Optional)

## ECTS credits:
6

**Teaching languages:** Catalan

## Teaching staff

**Coordinator:** JORDI QUER BOSOR

**Others:** Primer quadrimestre:
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:
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.
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.

### Generical:
1. CG-1. Show knowledge and proficiency in the use of mathematical language.
2. CG-2. Construct rigorous proofs of some classical theorems in a variety of fields of Mathematics.
3. 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.
4. CG-4. Translate into mathematical terms problems stated in non-mathematical language, and take advantage of this translation to solve them.
5. 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:
1. 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.
2. 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 20.00%</th>
<th>Hours medium group: 0h 0.00%</th>
<th>Hours small group: 30h 20.00%</th>
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</thead>
<tbody>
<tr>
<td>Guided activities:</td>
<td>0h 0.00%</td>
<td></td>
<td></td>
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<tr>
<td>Self study:</td>
<td>90h 60.00%</td>
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</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Fields and extensions</th>
<th>Learning time: 50h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 10h</td>
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<tr>
<td></td>
<td>Self study: 30h</td>
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</tbody>
</table>

**Description:**

<table>
<thead>
<tr>
<th>Galois Theory</th>
<th>Learning time: 50h</th>
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<table>
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<th>Applications</th>
<th>Learning time: 50h</th>
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**Description:**

### 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 \( AC + (10 - AC) \times \frac{NF}{10} \), with \( AC \) is the mark obtained in problem sessions and \( NF \) is the mark of the final exam.
Bibliography

Basic:


Complementary: