200232 - CITG - Combinatorics and Graph 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: English

Teaching staff

Coordinator: SIMEON MICHAEL BALL
Others: Primer quadrantemre:
  SIMEON MICHAEL BALL - A
  ORIOL SERRA ALBO - A

Degree competences to which the subject contributes

Specific:
3. CE-2. Solve problems in Mathematics, through basic calculation skills, taking into 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

(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: 30h</th>
<th>Hours medium group: 0h</th>
<th>Hours small group: 30h</th>
<th>Guided activities: 0h</th>
<th>Self study: 90h</th>
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### Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time:</th>
<th>Theory classes:</th>
<th>Laboratory classes:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. The symbolic method</strong></td>
<td>25h</td>
<td>5h</td>
<td>5h</td>
<td>15h</td>
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<tr>
<td><strong>2. Enumeration with symmetries</strong></td>
<td>15h</td>
<td>3h</td>
<td>3h</td>
<td>9h</td>
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<tr>
<td><strong>3. Finite geometry</strong></td>
<td>30h</td>
<td>6h</td>
<td>6h</td>
<td>18h</td>
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<tr>
<td><strong>4. Graph connectivity</strong></td>
<td>20h</td>
<td>4h</td>
<td>4h</td>
<td>12h</td>
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<td><strong>5. Matching</strong></td>
<td>20h</td>
<td>4h</td>
<td>4h</td>
<td>12h</td>
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<tr>
<td><strong>6. Graph coloring</strong></td>
<td>20h</td>
<td>4h</td>
<td>4h</td>
<td>12h</td>
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7. Extremal graph theory

Learning time: 20h
- Theory classes: 4h
- Laboratory classes: 4h
- Self study: 12h

Qualification system
- Midterm exam (contents 1, 2 and 3) (P)
- Final exam (either contents 4, 5, 6 and 7, or all the contents) (F)
- Final score: Max {(P+F) / 2, F}

Bibliography

Basic:

Complementary: