### 200232 - CITG - Combinatorics and Graph Theory

**Coordinating unit:** 200 - FME - School of Mathematics and Statistics  
**Teaching unit:** 749 - MAT - Department of Mathematics  
**Academic year:** 2019  
**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 quadrimestre:  
SIMEON MICHAEL BALL - M-A  
ORIOL SERRA ALBO - M-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.

#### Generical:
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)
200232 - CITG - Combinatorics and Graph Theory

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>20.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<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>
</tr>
</tbody>
</table>
# Content

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


