Course guides
200006 - CI - Integral Calculus

Unit in charge: School of Mathematics and Statistics
Teaching unit: 749 - MAT - Department of Mathematics.

Degree: BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Compulsory subject).

Academic year: 2021  ECTS Credits: 7.5  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: ANDRES MARCOS ENCINAS BACHILLER

Others:
Primer quadrimestre:
ANGELES CARMONA MEJIAS - CFIS, M-A
ANDRES MARCOS ENCINAS BACHILLER - CFIS, M-A, M-B
JAIME FRANCH BULLICH - M-B
ALBERT MAS BLESA - M-B

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CE-2. Solve problems in Mathematics, through basic calculation skills, taking in account tools availability and the constraints of time and resources.
2. CE-3. Have the knowledge of specific programming languages and software.
3. CE-4. Have the ability to use computational tools as an aid to mathematical processes.

Generical:
4. CB-1. Demonstrate knowledge and understanding in Mathematics that is founded upon and extends that typically associated with Bachelor's level, and that provides a basis for originality in developing and applying ideas, often within a research context.
5. CB-2. Know how to apply their mathematical knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader or multidisciplinary contexts related to Mathematics.
6. CB-3. Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.
7. CG-1. Show knowledge and proficiency in the use of mathematical language.
8. CG-2. Construct rigorous proofs of some classical theorems in a variety of fields of Mathematics.
9. 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.
10. CG-4. Translate into mathematical terms problems stated in non-mathematical language, and take advantage of this translation to solve them.
12. 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. 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>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>112.5</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>45.0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>30.0</td>
<td>16.00</td>
</tr>
</tbody>
</table>

**Total learning time:** 187.5 h

### CONTENTS

1. **Improper Integrals and Numerical Series**

   **Description:**

   **Full-or-part-time:** 37h
   Theory classes: 6h
   Practical classes: 6h
   Self study: 25h

2. **Multiple Integrals**

   **Description:**

   **Full-or-part-time:** 60h 30m
   Theory classes: 12h
   Practical classes: 8h
   Self study: 40h 30m

3. **Line and Surface Integrals**

   **Description:**

   **Full-or-part-time:** 24h
   Theory classes: 5h
   Practical classes: 3h
   Self study: 16h
### 4. Integral Theorems

**Description:**
Gradient, Divergence and Curl. Green’s Theorem, Stokes’ Theorem and Gauss’ Theorem. Applications: conservative and solenoidal vector fields.

**Full-or-part-time:** 37h 30m  
Theory classes: 7h 30m  
Practical classes: 5h  
Guided activities: 25h

### 5. Differential Forms

**Description:**

**Full-or-part-time:** 28h 30m  
Theory classes: 6h 30m  
Practical classes: 3h  
Self study: 19h

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### GRADING SYSTEM

A midterm exam (P) and a final exam (F).

The final course result will be calculated as follows:
Max \(0.3 \times P + 0.7 \times F\)

An extra exam will take place on July for students that failed during the regular semester.

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### BIBLIOGRAPHY

**Basic:**

**Complementary:**