230001 - CAL - Calculus

Degree competences to which the subject contributes

Achieving sufficient level of one variable Calculus to deal with, or to base the treatment of phenomena that can be described in these terms. Also support of parties other subjects that require mastery of real functions of one variable.

Introduction to functions defined by series, the Laplace Transform and its use to solve elemental differential equations and system of differential equations.

Teaching staff

Coordinator: JORGE JIMENEZ URROZ

Others:
Aguiló Gost, Francisco
Aroca Farrerons, Josep M.
Gracia Rivas, Ignacio
Gràcia Sabaté, Xavier
Jiménez Urroz, Jorge
Martín Molleví, Sebastià
Padró Laimón, Carles
Sáez Moreno, Germán

Teaching methodology

Problem solving classes
On campus lessons
Individual work (no face to face lessons)
Short answer controls and homework
Final exam (long answer exam)

Learning objectives of the subject

Achieving sufficient level of one variable Calculus to deal with, or to base the treatment of phenomena that can be described in these terms. Also support of parties other subjects that require mastery of real functions of one variable.

Introduction to functions defined by series, the Laplace Transform and its use to solve elemental differential equations and system of differential equations.
Learning outcomes:

Clearly expresses the process of planning and problem solving, and problems that require the use of calculus of one variable.
Comprehend and dominates the most useful methods for solving problems in the field of one variable.
He/she is able to confront the equations and numerical description of problems with descriptive statement.
He/she uses more than one source, and uses it as complementary to observe the events described in the main text.
Identifies problems and models from open situations. Study alternatives for their resolution.

<table>
<thead>
<tr>
<th>Study load</th>
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<tbody>
<tr>
<td><strong>Total learning time:</strong> 150h</td>
</tr>
<tr>
<td>Hours large group:</td>
</tr>
<tr>
<td>Self study:</td>
</tr>
</tbody>
</table>
### Unit 1. Real numbers

**Learning time:** 11h 30m  
- Theory classes: 5h  
- Self study: 6h 30m

**Description:**  

### Complex numbers

**Learning time:** 6h 54m  
- Theory classes: 3h  
- Self study: 3h 54m

**Description:**  

### Unit 3. Functions

**Learning time:** 16h 06m  
- Theory classes: 7h  
- Self study: 9h 06m

**Description:**  

### Unit 4. Function limits

**Learning time:** 16h 06m  
- Theory classes: 7h  
- Self study: 9h 06m

**Description:**  
## Unit 5. Continuity

### Learning time: 9h 21m
- Theory classes: 4h
- Self study: 5h 21m

### Description:

## Unit 6. Differentiability

### Learning time: 16h 06m
- Theory classes: 7h
- Self study: 9h 06m

### Description:

## Unit 7. Taylor polynomials

### Learning time: 11h 30m
- Theory classes: 5h
- Self study: 6h 30m

### Description:

## Unit 8. Local study of functions

### Learning time: 9h 12m
- Theory classes: 4h
- Self study: 5h 12m

### Description:
### Unit 9. Primitives

**Learning time:** 16h 06m  
- Theory classes: 7h  
- Self study: 9h 06m

**Description:**  
Definition. Calculation of immediate primitives, by parts and using change of variable. Calculation of rational primitives, trigonometric and irrational.

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### Unit 10. Riemann's Integral

**Learning time:** 9h 12m  
- Theory classes: 4h  
- Self study: 5h 12m

**Description:**  

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### Unit 11. Indefinite integrals.

**Learning time:** 9h 12m  
- Theory classes: 4h  
- Self study: 5h 12m

**Description:**  

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### Unit 12. Series of numbers and power series

**Learning time:** 13h 48m  
- Theory classes: 6h  
- Self study: 7h 48m

**Description:**  
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Planning of activities

<table>
<thead>
<tr>
<th>FINAL EXAMEN</th>
<th>Hours: 3h</th>
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<tbody>
<tr>
<td>Description:</td>
<td>Theory classes: 3h</td>
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<tr>
<td>Final exam</td>
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</table>

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>Hours: 3h</th>
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<tbody>
<tr>
<td>Description:</td>
<td>Theory classes: 3h</td>
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<tr>
<td>Short answer controls</td>
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Qualification system

Kind of exams to do and weight on the final evaluation:

Final exam: 60%
Continuous evaluation: 40%

On this subject will be evaluated the degree competences:

-Self-directed learning (Elementary level)
-Ability to identify, formulate and solve engineering problems (Elementary level)

Regulations for carrying out activities

The standard ones for this kind of controls

Bibliography

Basic:
Gracia, I.; Padró, C. Apunts de teoria per a l'assignatura de càlcul. (Atenea).

Complementary: