Degree competences to which the subject contributes

Basic:
CB1. Students will be able to demonstrate their knowledge of a field of study that builds on secondary education and is usually found at a level that, while supported by advanced textbooks, also includes aspects that involve knowledge of the latest developments in the field of study.
CB2. Students will be able to apply their knowledge to their work or vocation in a professional manner and demonstrate that they possess the competencies that are typically demonstrated by elaborating and defending arguments and solving problems in the field of study.

Specific:
CE2. Understanding and mastering the basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application for solving engineering problems.

General:
CG3. Knowledge of basic and technological subjects that will enable students to learn new methods and theories and that will endow them with the versatility needed to adapt to new situations.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
2. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Teaching methodology
MD1 Master class or lecture (EXP)
MD2 Problem solving and case study (RP)
MD3 Practical work in laboratory or workshop (TP)
MD7 Assessment activities (EV)

Learning objectives of the subject
At the end of the course, students should be able to do the following:
- Understand and use the basic principles of particle mechanics and systems of particles.
330503 - F1 - Physics 1

- Understand wave motion quantities applied to the study of mechanical waves.
- Understand the fundamental principles of thermodynamics and relate them to practical applications.
- Handle laboratory instruments, properly collect data, process data and prepare a report.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>22h 30m</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time: 112h 30m</td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>22h 30m</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## Content

### Topic 1: Particle mechanics and systems of particles

**Learning time:** 37h 30m  
Theory classes: 7h 30m  
Laboratory classes: 7h 30m  
Self study: 22h 30m

**Description:**  

**Related activities:**  
Activity 1: Laboratory practical  
Activity 2: Assessment test  
Activity 3: Delivery  
Activity 4: Final assessment test

**Specific objectives:**  
To understand and use the basic principles of particle mechanics.

### Topic 2: Wave motion and mechanical waves

**Learning time:** 37h 30m  
Theory classes: 7h 30m  
Laboratory classes: 7h 30m  
Self study: 22h 30m

**Description:**  
Wave motion, mechanical waves.

**Related activities:**  
Activity 1: Laboratory practical  
Activity 2: Assessment test  
Activity 3: Delivery  
Activity 4: Final assessment test

**Specific objectives:**  
To understand wave motion quantities applied to the study of mechanical waves.
### Topic 3: Thermodynamics

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 37h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature. First law of thermodynamics. Second law of thermodynamics.</td>
<td>Theory classes: 7h 30m</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 7h 30m</td>
</tr>
<tr>
<td></td>
<td>Self study: 22h 30m</td>
</tr>
</tbody>
</table>

**Related activities:**
- Activity 1: Laboratory practical
- Activity 2: Assessment test
- Activity 3: Delivery
- Activity 4: Final assessment test

**Specific objectives:**
To understand the fundamental principles of thermodynamics and relate them to practical applications.
## Planning of activities

| Activity 1: Laboratory practical | Hours: 4h 30m  
Laboratory classes: 1h 30m  
Self study: 3h |
|--------------------------------|------------------|
| **Description:** | - Laboratory teamwork.  
- The students read the instructions and produce a sheet to record the experimental data. |
| **Support materials:** | - Web page: http://www.epsem.upc.edu/practiquesfisica  
- All necessary equipment for carrying out the practical. |
| **Descriptions of the assignments due and their relation to the assessment:** | The team prepare and deliver a report to the professor, following the instructions. |
| **Specific objectives:** | At the end of the activity, students should be able to do the following:  
- Effectively handle the devices used in the activity.  
- Understand the physical concepts involved in the activity. |

| Activity 2: Assessment test | Hours: 7h 30m  
Theory classes: 1h 30m  
Self study: 6h |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Individual classroom test on the theoretical concepts of particle mechanics with exercises related to the learning objectives.</td>
</tr>
<tr>
<td><strong>Support materials:</strong></td>
<td>Test paper and calculator.</td>
</tr>
<tr>
<td><strong>Descriptions of the assignments due and their relation to the assessment:</strong></td>
<td>Completed test.</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td>After the activity, students should be able to understand and use the basic principles of particle mechanics.</td>
</tr>
</tbody>
</table>

| Activity 3: Delivery | Hours: 3h  
Self study: 3h |
<table>
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<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Individual multiple choice test about the theoretical concepts of particle mechanics, and/or problem solving related to the topic being studied.</td>
</tr>
<tr>
<td><strong>Support materials:</strong></td>
<td>Test paper and calculator.</td>
</tr>
<tr>
<td><strong>Descriptions of the assignments due and their relation to the assessment:</strong></td>
<td>Delivery of the completed test on time.</td>
</tr>
</tbody>
</table>
Specific objectives:
After the activity, students should be able to understand and use the basic principles of particle mechanics.

Activity 4: Final assessment test

| Hours: 13h |
|---|---|
| Theory classes: 3h |
| Self study: 10h |

Description:
Individual classroom test on the theoretical concepts of the subject with exercises related to the learning objectives.

Support materials:
Test paper and calculator.

Descriptions of the assignments due and their relation to the assessment:
Completed test.

Specific objectives:
After the activity, students should be able to understand and use the basic principles of the subject.

Qualification system
- Activity 1 (Laboratory practical) is repeated for each topic and is assessed within the denomination EV5 "Performance and quality of the work group (TG)". The set of three topics represent 25% of the final mark. To pass the subject, students must pass this assessment.
- Activity 2 (Assessment test) is repeated for each topic and is assessed within the denomination EV1 "Written test of knowledge (PE)", with 20% of the final mark for each topic.
- Activity 3 (Delivery) is repeated for each topic and is assessed as EV3 "Work done throughout the course (TR)", with 5% of the final mark for each topic.
- Students who have not passed one or more of the topics in Activity 2 must sit a final assessment test (Activity 4).

Regulations for carrying out activities
Each activity will be carried out according to the course schedule. An alternative day will be scheduled for students who are unable to perform one or more of the topics in Activity 1 on the day scheduled. Students who are unable to attend the tests in Activity 2 must sit the test in Activity 4. Activity 3 must be carried out on the day set.
Bibliography

Basic:


Complementary:


Others resources: