Degree competences to which the subject contributes

Specific:
1. Understanding and mastery of basic concepts about the general laws of mechanics, thermodynamics and electromagnetism fields and waves and their application to solving problems in engineering.

Learning objectives of the subject

If the Physics I course provides an understanding and domain of basic principles of Physics in its Mechanics aspect, the Physics II course will extend this domain to Oscillations, Waves and Thermodynamics.

On overcoming the subject, students will have acquired:

Understanding and mastery of kinematics and dynamics of the oscillations of particles as well as of solids.
Understanding and mastery of wave phenomena.
Understanding and mastery of the concepts of Temperature and Heat, and their applications in Thermodynamics.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 32h</th>
<th>21.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 14h</td>
<td>9.33%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 14h</td>
<td>9.33%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## 1. Oscillations

**Description:**
- Simple harmonic motion (SHM). Examples.
- Damped oscillations.
- Forced oscillations.
- Superposition of SHMs.

**Related activities:**
(ENG) 1,2,3,4,6,7,8

**Learning time:** 44h
- Theory classes: 10h
- Practical classes: 4h
- Laboratory classes: 4h
- Self study: 26h

## 2. Waves

**Description:**
- General introduction to wave motion.
- Physical description of some waves.
- Wave propagation.
- Superposition of waves.
- Acústica.

**Related activities:**
(ENG) 1,2,3,4,5,6,7,8

**Learning time:** 71h
- Theory classes: 14h
- Practical classes: 7h
- Laboratory classes: 6h
- Self study: 44h

## 3. Thermodynamics

**Description:**
- Temperature.
- Heat and changes of phase (or state).
- First law of Thermodynamics.
- Second law of Thermodynamics.

**Related activities:**
(ENG) 1,2,3,5,6,7,8

**Learning time:** 35h
- Theory classes: 8h
- Practical classes: 3h
- Laboratory classes: 4h
- Self study: 20h
### Planning of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
</table>
| 1. Theory Sessions | Theory classes: 28h  
Self study: 50h | 78h |
| 2. Practical Sessions | Self study: 23h  
Practical classes: 14h | 37h |
| 3. Laboratory | Laboratory classes: 12h  
Self study: 14h | 26h |
| 4. First Evaluation Test | Theory classes: 2h | 2h |
| 5. Second Evaluation Test | Theory classes: 2h | 2h |
| 6. Laboratory Evaluation Test | Laboratory classes: 2h | 2h |
| 7. Atenea Evaluation Test | Self study: 3h | 3h |
| 8. Delivering Works | Self study: 8h | 8h |
Qualification system

The final grade is the weighted sum of the various grades.

- If the final exam has chosen the modality of the Second Partial (explained in Activity 5):
  Final Grade = 0.32 * N1A + 0.43 * N2A + 0.15 * NL + 0.10 * NAC

- If the final exam has chosen the modality of the Global Exam (explained in Activity 5):
  - If the Global Examination grade, NEG, is greater than the grade of the First Partial, N1A:
    Final Grade = 0.32 * NEG + 0.43 * NEG + 0.15 * NL + 0.10 * NAC
  - If the Global Examination grade, NEG, is smaller than the grade of the First Partial, N1A:
    Final Grade = 0.32 * N1A + 0.43 * NEG + 0.15 * NL + 0.10 * NAC

N1A: First Partial score (activity 4)
N2A: Second Partial score (activity 5);
NEG: Global Exam grade (activity 5);
NL: grade of the laboratory (activity 6);
NAC: continuous evaluation grade (activity 7);

Regulations for carrying out activities

Bibliography

Basic:


Complementary:


Others resources:

Hyperlink

Apunts de l'assignatura a Atenea
http://atenea.upc.edu/moodle

Controls i notes en Aransa
http://aransa.upc.es

Física con ordenador (Ángel Franco García)
http://www.ehu.es