Course guide
220083 - F1 - Physics I

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 748 - FIS - Department of Physics.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: JUAN CARLOS CAÑADAS LORENZO - JOSE ANTONIO DIEGO VIVES
Others: MIGUEL MUDARRA LOPEZ

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.

Transversal:
2. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

TEACHING METHODOLOGY

Directed learning consists of several processes; First, consider theoretical classes, which take place in large groups. In this sessions the teacher introduces, briefly, the general objectives of the chapter and later, through practical exercises, try to involve the students for their active participation. The support material for this part is accesible through the virtual campus ‘ATENEA’ (goals, concepts, examples, and evaluation activities scheduled bibliography). Secondly, we conducted classes of problems that are developed in medium groups. Students work in these sessions in small groups through problem solving and numerical exercises related to the course objectives. Suffice to say that this is an opportunity to develop skills of teamwork and cooperative learning. Finally, in lab sessions, the student develop basic experimental skills (choosing the methodology, set objectives, obtain experimental results and conclusions), and is introduced to the scientific method as a way to solve technological problems. These sessions are done in small groups, in teams of two, and the students must write a report afterward as homework. Finally, it should be noted some time spent on individual learning such as recommended reading, problem solving and proposed questionaries through ATENEA (activity 7).

LEARNING OBJECTIVES OF THE SUBJECT

Providing an understanding and domain of basic principles of the Physics, in its aspect of Mechanics.
On overcoming the subject, student will have to demonstrate:
Knowledge and skills in vectorial algebra and its application to problems of statics.
Knowledge and skills in kinematics of particles and solids in movement.
Knowledge and skills in laws of the dynamics applied to particles and solids.
Knowledge of fluids statics.
### STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>32.0</td>
<td>21.33</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>14.0</td>
<td>9.33</td>
</tr>
<tr>
<td>Hours small group</td>
<td>14.0</td>
<td>9.33</td>
</tr>
</tbody>
</table>

**Total learning time:** 150 h

### CONTENTS

1. **Scalar and vectors.**

   **Full-or-part-time:** 15h
   - Theory classes: 3h
   - Practical classes: 1h
   - Laboratory classes: 4h
   - Self study: 7h

2. **Kinematic and dynamic of particle and systems.**

   **Description:**
   - Particle kinematics.
   - Relative motion.
   - Newton laws.
   - Work and energy.
   - Dynamics of systems of particles.
   - Collisions.

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

   **Full-or-part-time:** 76h
   - Theory classes: 17h
   - Practical classes: 8h
   - Laboratory classes: 4h
   - Self study: 47h
3. Kinematics and dynamics the rigid body.

Description:
Kinematics of the rigid body.
Sliding vectors.
Dynamic of the rigid body.
Statics.

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

Full-or-part-time: 43h
Theory classes: 9h
Practical classes: 4h
Laboratory classes: 4h
Self study : 26h

4. Statics Fluids.

Description:
(ENG) Pressió: mesura i unitats.
Principis de Pascal i Arquimèdes.

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

Full-or-part-time: 16h
Theory classes: 3h
Practical classes: 1h
Laboratory classes: 2h
Self study : 10h

ACTIVITIES

ACTIVITY 1. THEORY SESSIONS

Full-or-part-time: 65h
Theory classes: 28h
Self study: 37h

ACTIVITY 2. PRACTICAL SESSIONS

Full-or-part-time: 51h
Practical classes: 14h
Self study: 37h

ACTIVITY 3. LABORATORY

Full-or-part-time: 24h
Laboratory classes: 12h
Self study: 12h
ACTIVITY 4. EVALUATION TEST 1

Full-or-part-time: 2h
Theory classes: 2h

ACTIVITY 5. EVALUATION TEST 2

Full-or-part-time: 2h
Theory classes: 2h

ACTIVITY 6. LABORATORY EVALUATION TEST

Full-or-part-time: 2h
Laboratory classes: 2h

ACTIVITY 7. CONTINUOUS EVALUATION TEST IN ATENEA WEB

Full-or-part-time: 4h
Self study: 4h

GRADING SYSTEM

The final qualification is the sum of the following partial qualifications:

\[ N_{\text{final}} = 0.35*N_{\text{1A}} + 0.40*N_{\text{2A}} + 0.10*NL + 0.15*N_{\text{AC}} \]

\( N_{\text{final}} \): final qualification
\( N_{\text{1A}} \): qualification of the First Evaluation (activity 4)
\( N_{\text{2A}} \): qualification of the Second Evaluation (activity 5)
\( NL \): qualification of the Laboratory mark (activities 3 y 6)
\( N_{\text{AC}} \): qualification of the Continuous Evaluation

Unsatisfactory results from the first evaluation (\( N_{1A} \)) may be pass on a second attempt performing, in the second evaluation, an extended test covering the first and second evaluations. All enrolled students are allowed to perform this extended test. The qualification obtained in the second extended evaluation (\( N_{2A} \)) will replace the qualification from the first evaluation if \( N_{2A}*0.75 \) is greater than \( N_{1A}*0.35+N_{2A}*0.4 \).

The continuous evaluation consists on making different activities during the course, individual as well as in group, in the classroom and out of this. Part of these activities are the 'tests of continuous evaluation in ATENEA' (activity 7).

EXAMINATION RULES.

If any of programmed activities is not carried out, it will be considered as not punctuated.
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Hyperlink:
- http://atenea.upc.edu/moodle/
- http://aransa.upc.es/
- http://www.ehu.es