

# Course guide

## 220083 - F1 - Physics I

**Last modified:** 19/04/2023

**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:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

### LECTURER

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**Coordinating lecturer:** JUAN CARLOS CAÑADAS LORENZO - JOSE ANTONIO DIEGO VIVES

**Others:** MIGUEL MUDARRA LOPEZ

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CE04-INDUS. Ability to understand and apply the principles of basic knowledge of general chemistry, organic and inorganic chemistry, and their applications in engineering. (Basic training module)

**Transversal:**

CT04 N1. 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

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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

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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

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	32,0	21.33
Hours medium group	14,0	9.33
Hours small group	14,0	9.33

**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.  
Slidins 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 Arquímedes.

**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

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

$$N_{\text{final}} = 0.35 \cdot N_{1A} + 0.40 \cdot N_{2A} + 0.10 \cdot N_L + 0.15 \cdot N_{AC}$$

$N_{\text{final}}$ : final qualification

$N_{1A}$ : qualification of the First Evaluation (activity 4)

$N_{2A}$ : qualification of the Second Evaluation (activity 5)

$N_L$ : qualification of the Laboratory mark (activities 3 y 6)

$N_{AC}$ : 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  $N_{2A} \cdot 0.75$  is greater than  $N_{1A} \cdot 0.35 + N_{2A} \cdot 0.4$ .

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.

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



## BIBLIOGRAPHY

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### Basic:

- Juana Sardón, José María de. Física general, vol. 1 [on line]. 2a ed. Madrid: Pearson Educación, 2003 [Consultation: 17/06/2022]. Available on: [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=1238](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1238). ISBN 8420533424.
- Tipler, Paul Allen; Mosca, Gene. Física per a la ciència i la tecnologia, vol. 1 [on line]. Barcelona [etc.]: Reverté, 2010 [Consultation: 17/06/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5758258>. ISBN 9788429144321.

### Complementary:

- Jaén, Xavier [et al.]. Mecànica per a l'enginyeria. Barcelona: Edicions UPC, 2007. ISBN 9788483019245.
- Ortega Girón, Manuel R. Lecciones de física, vol. 1, Mecánica 1 [on line]. 8a ed. Córdoba: Departamento de Física Aplicada, Universidad de Córdoba, 1995 [Consultation: 14/05/2020]. Available on: <http://www.uco.es/users/fa1orgim/almacen/libros/LFMRP.pdf>. ISBN 8440442904.
- Serway, Raymond A. Física. 3a ed. Madrid: International Thomson, 2003. ISBN 8497321685.
- Beer, Ferdinand Pierre [et al.]. Mecánica vectorial para ingenieros, vol. 1, estática [on line]. 11ª ed. México: McGraw-Hill, 2017 [Consultation: 08/03/2023]. Available on: [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=8077](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=8077). ISBN 9781456255275.

## RESOURCES

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### Hyperlink:

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