

28801 - Basic physics I

Syllabus Information

Academic Year: 2019/20

Subject: 28801 - Basic physics I

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 424 - Bachelor's Degree in Mechatronic Engineering

ECTS: 6.0

Year: 1

Semester: First semester

Subject Type: Basic Education

Module: ---

1.General information

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

Expose the universal nature of physical laws, their inexorable character and the enormous benefits that are obtained from their knowledge in the field of engineering.

1.2.Context and importance of this course in the degree

Physics I is a basic training subject, with 6 ECTS credits this subject is taught during the first year of the degree in Industrial Organization Engineering.

It aims to provide the student with the basic knowledge of the most relevant phenomena and physical laws of application in the study of engineering; as well as the necessary tools to apply this theoretical knowledge to the resolution of engineering problems. More specifically, it focuses on the study of mechanics and thermodynamics.

1.3.Recommendations to take this course

It is a basic subject that must provide a first contact with the foundations, methods and scientific procedures of Physics. A close relationship is established with other analogous subjects such as physics II, Mathematics I, II, III inserted within the degree itself.

In order to face the subject with guarantees, it is recommended to have completed physics and mathematics in the second year of high school or equivalent.

2.Learning goals

2.1.Competences

Upon passing the subject, the student will be more competent to

- Generic competence:
 - **GI03:** Knowledge in basic and technological subjects, which enables them to learn new methods and theories, and give them the versatility to adapt to new situations.
 - **GI04:** Ability to solve problems with initiative, decision making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Mechatronic Engineering and in particular in the field of industrial electronics.
 - **GC02:** Interpret experimental data, contrast it with the theoretical and draw conclusions.
 - **GC03:** Capacity for abstraction and logical reasoning
 - **GC04:** Ability to learn in a continuous, self-directed and autonomous way.
 - **GC05:** Ability to evaluate alternatives.
 - **GC07:** Ability to lead a team as well as being a committed member of it.
 - **GC08:** Ability to locate technical information, as well as its understanding and assessment.
 - **GC10:** Ability to write technical documentation and to present it with the help of appropriate computer tools.
 - **GC11:** Ability to communicate their reasoning and designs clearly to specialized and non-specialized audiences.

- Specific competence:
 - **EB02:** Mastery of basic concepts about the principles of general mechanics, fields and waves, electromagnetism and its application to solve engineering problems.

2.2. Learning goals

Once the subject is passed, the student will be able to:

- Solve practical kinematics exercises using the concepts studied in the theoretical classes.
- Recognize the forces that intervene in a dynamic system and its effects.
- Identify which of the magnitudes studied in class are conserved in each particle system.
- Pose equations of forces and moments in static exercises.
- Solve problems of rotation of rigid solids around an axis.
- Describe mathematically the physics of harmonic and anharmonic oscillatory systems, in addition to interpreting damped and forced solutions.
- Use the first principle of thermodynamics to solve calorimetry exercises.
- Describe thermodynamic processes in ideal gases, as well as understand simple thermodynamic cycles.
- Use the basic equations that describe the elastic deformation of solids.
- Master the fundamental magnitudes that are used to describe a system in fluid mechanics.
- Take experimental measurements in the laboratory to later analyze the results and discuss them adequately both orally and in writing, adequately justifying the results.

2.3. Importance of learning goals

The activities carried out in this subject are of high formative content since they encourage the development of the reasoning, analysis and synthesis skills, problem-solving and application cases and initiation to laboratory work and to the application of the scientific method.

Due to its condition as a basic training subject, the competence acquired corresponds to what is required in every degree in the fields of Engineering and Architecture.

Being a subject taught during the first course, on the one hand, it should serve to strengthen and homogenize the knowledge acquired in previous educational stages and, on the other hand, act as a foundation to build on it the most specific technical knowledge that will be addressed in other subjects of the degree. In particular, all those that are related to mechanics, thermodynamics, elasticity and fluid mechanics.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

here is the possibility of passing the subject through two different routes:

- 1.- Continuous evaluation.
- 2.- Global Test.

Continuous assessment:

Following the spirit of Bologna, regarding the degree of involvement and continued work of the

- i.- Partial exams: Three partial exams will be carried out within the class schedule. You have
- ii.- Laboratory practices: 4 laboratory practices will be carried out. For each of them, the s
- iii.- Participation in class: It will be valued: the attendance to class, the participation ar

To qualify for the Continuous Assessment system, you must attend at least 80% of the face-to-f
Global Test:

The student must opt ??for this modality when, due to his / her personal situation, he / she c
As in the previous evaluation methodology, the final test of the final evaluation must have th

- i.- Final written test: On the date indicated by the University, a global examination of the s
- ii.- Laboratory practices: 4 laboratory practices will be carried out. For each of them, the s
- iii.- Participation in class: It will be valued: the attendance to class, the participation ar

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that is designed for this subject is based on the following:

The course consists of 6 ECTS credits, which represents 150 hours of student work on the subject during the semester. 40% of this work (60 h.) Will take place in the classroom, and the rest will be autonomous. One semester consists of 15 teaching weeks. To make the timing is used to measure the school week, in which the student must devote to the study of the subject 10 hours.

4.2. Learning tasks

The course includes the following learning tasks:

- Lectures: theoretical activities so fundamentally expository given by the teacher.
- Practice Sessions: practical discussion activities and conducting exercises conducted in the classroom and requiring high student participation.
- Laboratory Practice: Practical activities in laboratories.
- Group tutorials.
- individual tutoring.

4.3. Syllabus

The course will address the following topics:

- I. Kinematics
- II. Dynamics of one and several particles. Static.
- III. Rigid body dynamics
- IV. oscillatory movement
- V. Elasticity and fluids
- VI. Thermodynamics

4.4. Course planning and calendar

Planning for weeks about the subject is as follows:

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Topic	I	I	II	II	III	III	III/IV	IV	IV	V	V	VI	VI	VI	R
Exams				1º					2º						3º

4.5. Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28801&year=2019