# UNIVERSIDAD DE CASTILLA - LA MANCHA

# GUÍA DOCENTE

## 1. General information

**Course:** PHYSICS
**Code:** 37301
**Type:** BASIC
**ECTS credits:** 6
**Degree:** 340 - UNDERGRADUATE DEGREE PROGRAMME IN ENVIRONMENTAL SCIENCES
**Academic year:** 2023-24
**Center:** 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY
**Group(s):** 40
**Year:** 1
**Duration:** First semester
**Main language:** Spanish
**Second language:** English
**Use of additional languages:**
**English Friendly:** Y
**Web site:**
**Bilingual:** N

Lecturer: **FRANCISCO JAVIER TAPIADOR FUENTES** - Group(s): **40**

| Building/Office | Department | Phone number | Email | Office hours |
|---|---|---|---|---|
| Office 0.04, ICAM | CIENCIAS AMBIENTALES | 925268800 Ext. 5762 | francisco.tapiador@uclm.es | Any time, by e-mail appointment. |

## 2. Pre-Requisites

GCSE in Maths or Sciences.

## 3. Justification in the curriculum, relation to other subjects and to the profession

Environmental sciences are the study of the environment and its interactions with living things. Physics 101 is important for environmental sciences because it helps us to understand how the environment works and how it interacts with living things. Physics can help us to understand the effects of pollution on the environment, the behavior of greenhouse gases, and the role of the sun in climate change. Physics can also help us to develop new technologies for cleaning up the environment and for generating renewable energy. We will study the fundamental concepts of physics, paying more attention to those related to fluids, thermodynamics, waves and electricity, including quantum physics and relativity.

## 4. Degree competences achieved in this course

**Course competences**

| Code | Description |
|---|---|
| CB01 | Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge. |
| CB04 | Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences. |
| CB05 | Have developed the necessary learning abilities to carry on studying autonomously |
| E01 | Ability to understand and apply basic knowledge. |
| T03 | To use a correct oral and written communication. |

## 5. Objectives or Learning Outcomes

**Course learning outcomes**

Description

To know the basic concepts and principles of Physics that have a greater importance in the field of the study of the environment.

**Additional outcomes**

In physics, learning outcomes are the objectives or goals that students are expected to achieve after completing a course or learning experience. These objectives can be tangible, such as being able to correctly identify the parts of an atom, or intangible, such as understanding the principles of energy conservation. Regardless of their form, learning outcomes should be measurable so that students and instructors can determine whether or not the objectives have been met.

One of the most important aspects of physics is its ability to help us understand and predict the behavior of the natural world. As such, a major focus of physics education is to develop students' analytical and problem-solving skills so that they can apply these skills to real-world situations. Other important learning outcomes in physics include developing students' abilities to think critically about scientific information and to communicate their ideas effectively.

## 6. Units / Contents

**Unit 1: Introduction to Physics**
**Unit 2: Measuring Nature**
**Unit 3: Movement in one dimension**
**Unit 4: Movement in two dimensions**
**Unit 5: Newton's Laws**
**Unit 6: Momentum**
**Unit 7: Energy**
**Unit 8: Dot and cross products**
**Unit 9: Rotations**
**Unit 10: Angular moment**

**Unit 11: Elasticity**
**Unit 12: Fields and vector analysis**
**Unit 13: The Physics of Fluids**
**Unit 14: Measuring the Universe: gravitation**
**Unit 15: Oscillations and waves**
**Unit 16: Thermodynamics**
**Unit 17: Electric charges and electric and magnetic fields**
**Unit 18: Electromagnetism**
**Unit 19: Nature and electricity**
**Unit 20: Light and optical Physics**
**Unit 21: Relativity**
**Unit 22: Quantum Physics**
**Unit 23: The structure of matter**
**Unit 24: Cosmology**

## ADDITIONAL COMMENTS, REMARKS

This is Physics 101 in one semester.

## 7. Activities, Units/Modules and Methodology

| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
|---|---|---|---|---|---|---|---|
| Class Attendance (theory) [ON-SITE] | Lectures | CB01 CB04 CB05 E01 T03 | 0.52 | 13 | Y | N | Lectures |
| Class Attendance (practical) [ON-SITE] | Problem solving and exercises | CB01 CB04 CB05 E01 T03 | 0.52 | 13 | Y | N | Physics problems and exercises |
| Self-study [OFF-SITE] | Case Studies | CB01 CB04 CB05 E01 T03 | 1.6 | 40 | Y | Y | Additional exercises and essays, discretional. |
| Mid-term test [ON-SITE] | Assessment tests | CB01 CB04 CB05 E01 T03 | 0.08 | 2 | Y | Y | Mid-term test, First part of the course. |
| Mid-term test [ON-SITE] | Assessment tests | CB01 CB04 CB05 E01 T03 | 0.08 | 2 | Y | Y | End-term test, Second part of the course. |
| Problem solving and/or case studies [ON-SITE] | project-based learning | CB01 CB04 CB05 E01 T03 | 1.2 | 30 | Y | Y | Student's notes assessment. Randomly selected. |
| Study and Exam Preparation [OFF-SITE] | Self-study | CB01 CB04 CB05 E01 T03 | 2 | 50 | Y | Y | Self-study for the exams. |
| | | **Total:** | **6** | **150** | | | |
| **Total credits of in-class work: 2.4** | | | | | | | **Total class time hours: 60** |
| **Total credits of out of class work: 3.6** | | | | | | | **Total hours of out of class work: 90** |

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

## 8. Evaluation criteria and Grading System

| Evaluation System | Continuous assessment | Non-continuous evaluation* | Description |
|---|---|---|---|
| Mid-term tests | 25.00% | 50.00% | Mid-term exam. First part of the course. Continuous assessment students who have also completed the hand-ins, logged in and downloaded resources from campusvirtual and attended the tutorials can take the course book with them. Non-continuous students may not, under any circumstances use the book for the January exam. |
| Mid-term tests | 25.00% | 50.00% | Partial exam. Second part of the course. It takes place in the last week of December. Continuous assessment students who have also completed the hand-ins, logged in and downloaded resources from campusvirtual and attended the tutorials can take the course book with them. Non-continuous students may not, under any circumstances use the book for the January exam. |
| Other methods of assessment | 50.00% | 0.00% | The students must hand in the project-oriented activities proposed in some of the sessions using ICTs in the same class, and all hand-ins must be completed in order to be able to take the exam with the book. In order to be able to take the exam with the book, it is also necessary to have attended the compulsory tutorials that the teacher has asked the student to attend. In order to take the exam with the book, the student must also have downloaded all the notes posted on the Virtual Campus, and take them every week. This does not need to be registered because the university system monitors and registers the entries and what each student (and each professor) does on the platform. |
| **Total:** | **100.00%** | **100.00%** | |

*According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of*

*the competences).*

**Evaluation criteria for the final exam:**

**Continuous assessment:**

The final grade is the weighted average of the first partial (first part of the subject, 25%), the second partial (second part of the subject, 25%) and the activities that are done and collected in some of the classes (50%). There are no minimum marks: in theory you can pass with a 10 in the assignments, and a zero in each of the exams. Getting an A in the hand-ins is easy: just take notes in class and hand them in at the end of the class if you are required to do so. Note that if you fail the assignments (which account for 50% of the grade) you have to get an A in the exams to pass. The book can only be taken to the exams if you have done the assignments, attended the compulsory tutorials set by the professor, and if the student has personally downloaded resources from the virtual campus every week. The book cannot contain any annotations or additions of any kind, except for the student's name. The exam with a book is extremely easy to pass. In other words, the student who wants to pass the exam on the first try has to do the following: go to class, take notes during the session, hand them in if requested at the end of the class, go to the tutorials if called, and enter the virtual campus every week to download the new content. The rest of the mark will be the mid-term exams, which if you have done the above, you will be able to answer with the book in front of you. Note that there is no final exam in January. Evaluation criteria: depth and coherence of reasoning, adequacy of the approaches used in the resolution of exercises, correctness of answers, correctness in the interpretation of the results, clarity, and organisation in the writing of the answers. Theoretical questions must go beyond the verbatim of the book to show that the subject has been understood.

**Non-continuous evaluation:**

The final grade is the weighted average of the exam corresponding to the first midterm (first part of the course, 50%) and the exam corresponding to the second midterm (second part of the course, 50%). The ordinary test in non-continuous mode consists of a single January test that is made up of two exams. In non-continuous assessment, the book cannot be taken to the test. This non-continuous evaluation system, which is permitted by the regulations and which consists of passing everything and taking exams, is not advisable if you want to learn. Nor do I think it is useful for passing: this method tends to give worse results for students, especially if they did not get good marks in Physics in the Baccalaureate. In that case, it is often difficult to pass a physics exam at the level required at a university. Evaluation criteria: depth and coherence of reasoning, appropriateness of the approaches used in the resolution of exercises, correctness of answers, correctness in the interpretation of results, clarity and organisation in the writing of answers. Theoretical questions must go beyond the verbatim of the book to show that the subject has been understood.

**Specifications for the resit/retake exam:**

The same as the non-continuous in the ordinary exam. It is a single physics exam at university level in two parts, in which everything is included and in which all the competences are assessed. You have to do it without the book, even if you have done the deliveries, entered and downloaded resources from the virtual campus, and attended the compulsory tutorials.

**Specifications for the second resit / retake exam:**

The same as the extraordinary course, modified at the professor's discretion if academic circumstances make it advisable to make a change aimed at facilitating the student's achievement of the competences.

## 9. Assignments, course calendar and important dates

**Not related to the syllabus/contents**

| Hours | hours |
|---|---|
| Class Attendance (theory) [PRESENCIAL][Lectures] | 13 |
| Class Attendance (practical) [PRESENCIAL][Problem solving and exercises] | 13 |
| Self-study [AUTÓNOMA][Case Studies] | 40 |
| Mid-term test [PRESENCIAL][Assessment tests] | 2 |
| Mid-term test [PRESENCIAL][Assessment tests] | 2 |
| Problem solving and/or case studies [PRESENCIAL][project-based learning] | 30 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 50 |

**Global activity**

| Activities | hours |
|---|---|
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 50 |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 13 |
| Class Attendance (practical) [PRESENCIAL][Problem solving and exercises] | 13 |
| Self-study [AUTÓNOMA][Case Studies] | 40 |
| Mid-term test [PRESENCIAL][Assessment tests] | 2 |
| Mid-term test [PRESENCIAL][Assessment tests] | 2 |
| Problem solving and/or case studies [PRESENCIAL][project-based learning] | 30 |
| **Total horas:** | 150 |

## 10. Bibliography and Sources

| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
|---|---|---|---|---|---|---|
| Serway and Jewett | Physics for Scientists and Engineers with Modern Physics | Brooks/Cole | | 978-1-133-95405-7 | 2014 | Libro complementario. Contiene mucho más de lo que se ve durante el curso. |
| | https://www.cengage.uk/c/physics-for-scientists-and-engineers-with-modern-physics-10e-serway-jewett/9781337553292/ | | | | | |
| Francisco J. Tapiador | La Física de la Naturaleza | Los libros de la catarata | | 978-84-1352-606-5 | 2023 | El libro de la asignatura. Todo lo que entra está aquí, aunque no se estudia el libro entero. |
| | https://www.catarata.org/libro/la-fisica-de-la-naturaleza_146704/ | | | | | |