

Academic Year/course: 2022/23

69767 - Supplementary Course in Physics

Syllabus Information

Academic Year: 2022/23

Subject: 69767 - Supplementary Course in Physics

Faculty / School: 100 - Facultad de Ciencias

Degree: 627 - Master's Degree in Circular Economy

ECTS: 3.0

Year: 01

Semester: First semester

Subject Type: ENG/Complementos de Formación

Module:

1. General information

1.1. Aims of the course

The *Physics Supplements* course allows to achieve the knowledge and skills on Physics necessary for the adequate follow-up of the compulsory and optional subjects of the Master in Circular Economy. The assessable contents of Physics Supplements, in isolation, do not provide the student with any of the capacities that contribute to the achievement of the sustainable development goals, SDG, but they are essential to base the subsequent knowledge of the rest of the master's degree, which is more directly related to the SDGs of the 2030 Agenda.

1.2. Context and importance of this course in the degree

The Physics Complements course is taught in the first months of teaching the Master in Circular Economy. This subject is aimed mainly at students from the macro area of Social and Legal Sciences. The subject is taught from the University of Zaragoza.

1.3. Recommendations to take this course

Physics Complements is an introductory subject for Master's students with limited training in Physics. Regular use of the teaching platform and daily study of the concepts presented are recommended, with special emphasis on solving practical activities. Likewise, it is vital to consult the doubts and questions that pose difficulties in the teaching and learning process, for which personalised tutorials should be used.

2. Learning goals

2.1. Competences

BASIC COMPETENCES

CB6 - Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

CB7 - Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

CB8 - Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.

CB9 - Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences clearly and unambiguously.

CB10 - Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

GENERAL COMPETENCES

CG1 - Obtain information in Spanish and English using information technologies efficiently

CG2 - Manage, critically analyse and synthesise information

CG3 - Critically reflect in a systemic way and using causal relationships

CG4 - Formulate, analyse, evaluate and compare in a multidisciplinary way new or alternative solutions for different problems

CG5 - Work in interdisciplinary groups

CG6 - Transmit information efficiently through information and communication technologies

CG7 - Develop management skills (decision making, goal setting, problem definition, design, and evaluation)

CG8 - Properly manage available resources on time

SPECIFIC COMPETENCES

CE1 - Manage the vocabulary and concepts required for learning the fundamentals of Circular Economy.

2.2. Learning goals

The student, passing this subject, achieves the following results:

1. Be able to recognise the concept of energy as the capacity to produce changes.
2. Be able to argue that energy can be transferred, stored, or dissipated, but not created or destroyed, using examples.
3. Being able to define energy and power as magnitudes, expressing them in the most common units.
4. Be able to identify the different types of energy and the transformations of one into another.
5. Be able to identify the main sources of energy of industrial interest.
6. Be able to identify energy transport mechanisms.
7. Know the limitation that the phenomenon of energy degradation supposes for the design of energy production, transport and consumption systems.

2.3. Importance of learning goals

Obtaining the learning results is essential for proper monitoring of the compulsory and optional subjects of the Master in Circular Economy.

3. Assessment (1st and 2nd call)

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

The assessment tests will consist of written sentences that may be short answers, long answers, and/or development. The evaluation of the subject must be done with a single test that will constitute 100% of the grade.

The number of official exam sessions to which enrollment entitles (2 per enrollment), as well as the consumption of these calls, will be adjusted to the Rules of Permanence in Master's Studies and the Rules of Learning Assessment of the University of Zaragoza (<https://ciencias.unizar.es/normativas-asuntos-academicos>). To this last regulation, the general criteria for the design of the tests and the grading system will also be adjusted, and according to the same, the time, place, and date on which the review will be held when publishing the qualifications will be made public. The official calls will constitute the global evaluation system where students can obtain a complete grade for the subject.

Notwithstanding the foregoing, a continuous evaluation system will be enabled during the period established for the teaching of the subject. Those students who wish to be evaluated through this system must make a series of mandatory deliveries, according to the dates to be indicated during the course. Successful passing in the evaluation of the previous deliverables will imply the possibility of taking a single written test of continuous evaluation, which, as in the global evaluation, will provide 100% of the qualification. The realisation of the continuous evaluation test will not imply in any case the consumption of any of the global evaluation calls, although, in case of successfully passing it, the corresponding grade would be considered for the first call evaluation. Additionally, students who obtain a grade through continuous assessment have the right to take the global assessment in the first call, in which case, the final grade will correspond to the higher of the two obtained by both routes.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

Learning in this subject is based on the combination of the expository method and the flipped classroom.

According to the expository method, the professor develops the presentation of the topics before the students present in the same classroom or other universities through videoconference. In addition, other teaching materials will be included in the Moodle platform that will allow dedicating some of the classes to interact with students, posing questions that allow relating concepts.

The approach, methodology and evaluation of this guide are prepared to be the same in any teaching scenario. They will be adjusted to the socio-sanitary conditions of each moment, as well as to the indications given by the competent authorities.

4.2. Learning tasks

This is a 3 ECTS credits course organised as follows:

- Lectures (8 hours). Whole group sessions of 50 minutes each one will be taken. Lecturers explain the theoretical contents and solve representative applied problems. Learning materials will be available on the virtual platform Moodle. Regular attendance is highly recommended.
- Practice sessions (22 hours, including 4 face-to-face hours). Solving practical exercises will be required.
- Autonomous work and study (42 hours). Students are expected to study theory.
- Assessment tasks (3 hours). A final written examination including short answer and problem-solving questions will be carried out.

4.3. Syllabus

1. Physical concept of energy. Force and acceleration. Kinetic and potential energy. Work of a force.
2. First principle of thermodynamics. Heat and work. Thermal machine.
3. Second principle of thermodynamics. Maximum performance of a machine. Irreversible processes: no idealities and friction.
4. Energy. Types of energy. Energy sources. Energy transformation and transport. Energy consumption and storage.

4.4. Course planning and calendar

Information on schedules, calendar, and exams is published on the Master's page on the website of the Faculty of Sciences of the University of Zaragoza (<https://ciencias.unizar.es/master-en-economia-circular>). The presentation of reports will be carried out according to the calendar that will be announced in due course through the Moodle page of the subject.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69767>