

Academic Year/course: 2022/23

## 60026 - Advanced topics in physics

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 60026 - Advanced topics in physics

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 538 - Master's in Physics and Physical Technologies

589 - Master's in Physics and Physical Technologies

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The course presents a series of seminars on advanced topics in physics chosen among the forefront of fundamental and applied physics research fields today. In addition the student will have the opportunity to deepen his knowledge on one specific topic of his/her choice.

These aims are in agreement with the following Sustainable Development Goals (SDG) form United Nations (<https://www.un.org/sustainabledevelopment/>) :

- Goal 1 (No poverty)
- Goal 3 (Good Health and well-being)
- Goal 4 (Quality education)
- Goal 5 (Gender equality)
- Goal 6 (Clean water and sanitation)
- Goal 7 (Affordable and clean energy)
- Goal 8 (Decent work and economic growth)
- Goal 9 (Industry, Innovation and Infrastructure)
- Goal 10 (Reduced inequalities)
- Goal 11 (Sustainable cities and communities)
- Goal 12 (Responsible consumption and production)
- Goal 13 (Climate action)
- Goal 14 (Life below water)
- Goal 15 (Life on land)
- Goal 16 (Peace, justice and strong institutions)
- Goal 17 (Partnerships for the goals)

## 2. Learning goals

## 3. Assessment (1st and 2nd call)

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

A continuous evaluation will take into account the personal work of the students throughout the course. The students will have to solve a questionnaire for each one of the different parts of the course. The evaluation (50% of the final mark) will

reflect the quality of the solutions given to these questionnaires.

Regarding the intensification work in a subject chosen by the student, the student must write a short report (up to 10 pages) that summarizes the fundamental aspects of the work done. In addition, the student must deliver an oral presentation of up to 10 minutes, before the rest of students, the teacher and the master coordinator, who will ask questions that they deem necessary. The evaluation of this activity (50% of the final grade) also reflect the quality of the answers to such questions.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It favors the acquisition of theoretical and experimental expertise in the general fields of physics. In order to get these results, we have programmed activities that improve the students' active and continuous implication within the different topics.

The course consists of three well-separated training activities: a programmed set of seminars on the different topics (2.4 ECTS); the solving and defense of a set of questionnaires on such topics (0.6 ECTS); and guided study and assessment of an assignment on a topic related to the seminars' contents (3 ECTS).

### 4.2. Learning tasks

The course includes the following learning tasks:

- Seminars (2.4 ECTS: 60 hours)
- Short test (0.6 ECTS)
- Assignment (3 ECTS)

The teaching and assessment activities will be carried out in person unless, due to the health situation, the provisions issued by the competent authorities and by the University of Zaragoza arrange to carry them out on-line.

### 4.3. Syllabus

The course will address the following topics:

- Topic I. Frontiers in particle physics and cosmology
- Topic II. Physics of novel materials
- Topic III. Large scientific installations in physics
- Topic IV. Physical technologies for renewable energy sources
- Topic V. Topics on biological physics
- Topic VI. Computation, networks and physics

### 4.4. Course planning and calendar

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Science website <http://ciencias.unizar.es/>

### 4.5. Bibliography and recommended resources

[http://biblos.unizar.es/br/br\\_citas.php?codigo=27102&year=2019](http://biblos.unizar.es/br/br_citas.php?codigo=27102&year=2019)