

Academic Year/course: 2022/23

26906 - Physics Laboratory Work

Syllabus Information

Academic Year: 2022/23

Subject: 26906 - Physics Laboratory Work

Faculty / School: 100 - Facultad de Ciencias

Degree: 447 - Degree in Physics

ECTS: 6.0

Year: 1

Semester: Second semester

Subject Type: Basic Education

Module:

1. General information

1.1. Aims of the course

The aims of the course are aligned with the following Sustainable Development Goals (SDGs):

- Goal 4: Quality Education

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

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

- Introduction to the treatment of experimental data: systematic and random error, precision, estimators, Gaussian distribution, error propagation, least-squares adjustments.
- Conducting laboratory practices related to the contents of Fundamentals of Physics, such as determining dynamic quantities, properties of mechanical oscillations, mechanical and thermal properties of materials, thermodynamic systems, fluid mechanics, measuring electrical quantities, electric and magnetic fields, wave velocity, standing waves, basic properties of light, measurement of fundamental constants.

4.2. Learning tasks

The course includes the following learning tasks:

- **Formative Activity 1:** Acquisition of basic knowledge of data processing: errors, estimators, etc. (1 ECTS). Methodology: 5 hours of lectures and 2 problem solving in small groups during the week from 13 to 17 February. Application to laboratory work.
- **Formative Activity 2:** Conducting laboratory experiments in small groups (4.5 ECTS). Methodology: 11 Practice laboratory sessions. 4 hours classroom for practice-week for 11 weeks (weeks of February 20 to June 8). The

student has one week time from the completion of the practice to present the written report of it. The explanation of work has will be done in small groups. In these activities there will be team work form making experimental data, preparation of reports and tutorials to discuss the content of the reports groups.

- **Formative Activity 3:** Exhibition of work (0.5 ECTS). Methodology: Oral presentation corresponding to one of the practices (week of May 28) report.
- **Practice exam:** will be held over a week in sessions of 2 hours per student, and following an equivalent to the development of a practice scheme. Week of June 11.
- **Final exam** of the subject (for non-contact students) will be held on the date indicated by the Faculty of Sciences.

4.3. Syllabus

The course will address the following topics:

- **Syllabus of lectures:**
 - Topic 1. Error Handling
 - Topic 2. Site Statistics Distributions
 - Topic 3. Error propagation
 - Topic 4. Adjustments least squares
- **Laboratory Syllabus:**
 - Topic 1. Rigid body
 - Topic 2. Vibratory motion
 - Topic 3. Mechanical properties
 - Topic 4. Thermal properties
 - Topic 5. Fluids
 - Topic 6. Electrical quantities
 - Topic 7. Electric and magnetic fields
 - Topic 8. Light and sound
 - Topic 9. Fundamental constants
 - Topic 10. Standing waves and diffraction
 - Topic 11. Basic properties of light

4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Facultad de Ciencias web <https://ciencias.unizar.es/grado-en-fisica-0>

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26906>