

26906 - Physics Laboratory Work

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	447 - Degree in Physics
ECTS	6.0
Course	1
Period	Second semester
Subject Type	Basic Education
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process that is designed for this subject 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.

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5.2. Learning activities

Activity 1: Acquisition of basic knowledge of data processing: errors, estimators, etc. (1 ECTS)

Methodology:

- Participative Master Class.
- Troubleshooting and small group cases.
- Application to laboratory work.

Program of lectures:

1. Error Handling
2. Site Statistics Distributions
3. Error propagation
4. Adjustments least squares

Formative Activity 2: Conducting laboratory experiments in small groups (4.5 ECTS)

Methodology:

- Work in the laboratory.
- Explanation of work to be done in small groups.
- Teamwork for making experimental data
- Preparation of reports.
- Tutorials in reduced to discuss the content of the reports groups.

Program:

- P1. rigid body
- P2. vibratory motion
- P3. Mechanical properties
- P4. thermal properties
- P5. fluids
- P6. electrical quantities
- P7. electric and magnetic fields
- P8. Light and sound
- P9. fundamental constants
- P10. standing waves and diffraction
- P11. basic properties of light

Formative Activity 3: Exhibition of work (0.5 ECTS)

Methodology:

- Oral presentation of one of the reports made.

5.3. Program

Program of lectures:

1. Error Handling
2. Site Statistics Distributions
3. Error propagation
4. Adjustments least squares

Laboratory Program:

- P1. rigid body
- P2. vibratory motion
- P3. Mechanical properties
- P4. thermal properties
- P5. fluids
- P6. electrical quantities
- P7. electric and magnetic fields
- P8. Light and sound
- P9. fundamental constants
- P10. standing waves and diffraction
- P11. basic properties of light

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5.4.Planning and scheduling

Schedule sessions and presentation of works

Training Activity 1: 5 hours of lectures and 2 problem solving in small groups during the week from 13 to 17 February.

Training activity 2: 11 Practical laboratory. 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.

Training activity 3: 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 practical 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.

5.5.Bibliography and recommended resources

- Kirkup, Les. Experimental methods : an introduction to the analysis and presentation of data / Les Kirkup . Brisbane [etc.] : John Wiley and Sons, cop. 1994
- Kirkup, Les. Data analysis with excel an introduction for physical scientists Cambridge University Press (2002)
- Barlow, Roger. Statistics : a guide to the use of statistical methods in the physical sciences / Roger Barlow . - 1st ed. repr. Chichester [etc.] : John Wiley, 1999
- Sánchez del Río, Carlos. Análisis de errores / Carlos Sánchez del Río Madrid : Eudema, D.L. 1989