

SUBJECT TEACHING GUIDE

G78 - Experiments for Teaching Physics

Double Degree in Physics and Mathematics Degree in Physics

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Physics			Type and Year	Optional. Year 5 Optional. Year 4
Faculty	Faculty of Sciences				
Discipline	Subject Area: Experimentation in Teaching Mention in Applied Physics				
Course unit title and code	G78 - Experiments for Teaching Physics				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. FISICA APLICADA				
Name of lecturer	JOSE ANGEL MIER MAZA				
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Other lecturers	JOSE JULIO GÜEMEZ LEDESMA				

3.1 LEARNING OUTCOMES

- To understand and to defend the key role of experimentation in learning physics and in general in the development of Science.
- To identify the opportunity to carry out experimental work in the context of teaching in different courses and levels .
- To be able to design and carry out a simple experiment to reveal a significant physical phenomenon .
- To know the techniques and basic components for setting up an experiment .
- To be able to develop a complete experimental project for students , increasing its didactic effectiveness: identification of objectives, way of attracting curiosity, definition of the parameters to be analyzed and measured, elaboration of an adequate didactic guide including an evaluation questionnaire and a format for the presentation of the work carried out.
- To propose new experiments contrasting the existing possibilities in the bibliography and taking advantage of the available commercial components.
- To identify key experiments for Physics teaching and historical instrumentation of educational interest .
- To be able to introduce in the programming of a subject all the appropriate experimental components (demonstrations, experiments, visits to museums, observatories or scientific facilities).
- To identify experimental opportunities transversal to other subjects , and in particular related to everyday phenomena.

4. OBJECTIVES

Be able to make a written report and a multimedia presentation (if necessary, virtually) of topics such as, a physics problem, a Fermi question, a summary of a scientific article and a physics topic.

Be able to design and perform a simple experience to highlight a significant physical phenomenon

Know the techniques and basic components for setting up an experiment

To be able to develop a complete experimental project for students: identification of objectives, elaboration of didactic guide, evaluation questionnaire, etc.

To propose new experiments contrasting the existing possibilities in the bibliography and taking advantage of the commercial components available.

6. COURSE ORGANIZATION

CONTENTS

1	Students take written reports and multimedia presentations of the issues: (i) a physics problem (3 weeks) during this process learn how to use LaTeX; (ii) a question of Fermi (2 weeks) and (iii) a summary of a scientific article (3 weeks). Before each point, the teacher presents their own summaries and makes their own presentations of the same.
2	Students prepare a written summary of an oral presentation and (iv) a physics experiment, carried out by themselves (3 weeks), and (v) a theme of basic physics (2 weeks). In each presentation by a student will be required to completion, the reasoned opinion of other students on the same. These views will be evaluated according to their relevance, interest, etc. Where appropriate, presentations can be made virtually.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
To obtain the maximum mark (10), it is required to submit five reports and make five multimedia presentations (which, if applicable, can be virtual) on: (i) a physics problem, (ii) a Fermi question, (iii) an abstract of a scientific article, (iv) a physic	Oral Exam	Yes	Yes	30,00
Oral exposure of at least three experiments. Where appropriate, presentations can be made virtually.	Work	No	Yes	70,00
		No	No	0,00
TOTAL				100,00
Observations				
To obtain the maximum mark (10), it is required to submit five reports and make five multimedia presentations (which, if applicable, can be virtual) on: (i) a physics problem, (ii) a Fermi question, (iii) an abstract of a scientific article, (iv) a physics experiment (including a student guide), and (v) a basic physics topic. Each one of the reports and each one of the presentations will be graded in the proportional part of the note, which will be that of its duration in weeks. The five presentations are related to the same five reports.				
Observations for part-time students				
To the extent possible, and in accordance with the teacher, an attempt will be made to facilitate the monitoring of the subject.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Artículos de revistas pedagógicas de Física: American Journal of Physics, European Journal of Physics, Physics Teacher, Physics Education. Esta bibliografía será proporcionada por el profesor.