

## SUBJECT TEACHING GUIDE

### G78 - Experiments for Teaching Physics

#### Double Degree in Physics and Mathematics Degree in Physics

Academic year 2021-2022

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				
E-mail	joseangel.mier@unican.es				
Office	Facultad de Ciencias. Planta: + 2. DESPACHO PROFESORES (2033)				
Other lecturers	JOSE JULIO GÜEMEZ LEDESMA				

### 3.1 LEARNING OUTCOMES

- Make written reports and multimedia presentations, physical problems, issues of Fermi, topics of physics, etc. Make written reports and multimedia presentations of a physical article published in international journals. Designing simple experiments using simple materials. Develop the skill of previous estimates, working with approaches and orders of magnitude. Develop the communication skills of the experimental designs.

#### 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 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.
2	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.

#### 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 on: (i) a physics problem, (ii) a Fermi issue, (iii) a summary of a scientific paper, (iv) an experiment -- including a student guide -- and (v)	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
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
Delivery of at least five reports, and perform five multimedia presentations (which may be virtual, where appropriate) on: (i) a physics problem, (ii) a question of Fermi, (iii) a summary of a scientific article, (iv) an experiment -- including a student guide -- and (v) a theme of basic physics. Delivery of at least six simple experiments. Each of the reports and each of the presentations will be graded in the proportional part of the note, which shall be that of its duration in weeks.				
<b>Observations for part-time students</b>				
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.