SUBJECT TEACHING GUIDE

G1775 - Advanced Experimental Techniques (2C)

Double Degree in Physics and Mathematics
Degree in Physics

Academic year 2023-2024

1. IDENTIFYING DATA				
Degree	Double Degree in Physics and Mathematics Degree in Physics		Type and Year	Optional. Year 4 Optional. Year 4
Faculty	Faculty of Sciences			
Discipline	Subject Area: Advanced Experimental Techniques Transversal Module: Specialisation Research / Applied Physics			
Course unit title and code	G1775 - Advanced Experimental Techniques (2C)			
Number of ECTS credits allocated	6	Term	Semester based (2)	
Web				
Language of instruction	English		Mode of delivery	Face-to-face

Department	DPTO. FISICA APLICADA
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Other lecturers	MANUEL PEREZ CAGIGAL ANGEL ALBERTO VALLE GUTIERREZ JOSE IGNACIO ESPESO MARTINEZ PABLO ALBELLA ECHAVE ANA QUIRCE TEJA JESUS MANUEL VIZAN GARCIA GUILLERMO SERRERA PARDUELES

3.1 LEARNING OUTCOMES
- Use of advanced experimental setups and knowledge in instrumentation control.
- Knowledge of basic elements of different experimental devices , their physical principles and applications.
- Being able to choose the proper experimental technique to unveil the physics of a given experimental problem.
- Knowing to properly analyse and discuss the experimental data. Being able to fit these experimental data by using existing software or by developing new one. Being accurate in data discussion and, if possible, comparing these data with already known results.
- Development of technical accounts in English, in order to integrate them into the scientific report of an experiment.
- Being able to carry out an oral presentation in English, over a fixed limited time, of one of the experimental projects.

4. OBJECTIVES
The main goal of the subject is that the student will lead four different projects (from different topics in Physics) at an advanced level.
It is expected that the student will get lab skills, will know material with general and specific purposes and will deepen into the experimental data treatment (data acquisition, graphical representation, fit to theoretical models, etc.).
It is advisable that the student will arrive to properly manage as a speaker when presenting, in English, one of the led projects.

6. COURSE ORGANIZATION	
CONTENTS	
1	To carry out one of the following experimental projets: - Analysis of a Luminous Signal with Deterministic Profile by using Photon Counting Techniques (Poject 1). - Shack-Hartmann Wavefront Sensor (Project 2). - Ferromagnetic materials characterization (hysteresis loops) (Project 3). - Neutron detection. Measue of the Thermal Neutron Flux of an Am-Be Neutron Source (Project 4)
2	To carry out one of the following experimental projets: - Shack-Hartmann Wavefront Sensor (Proyect 2). - Ferromagnetic materials characterization (hysteresis loops) (Project 3). - Neutron detection. Measue of the Thermal Neutron Flux of an Am-Be Neutron Source (Project 4). - Advanced characterization of semiconductor lasers (Project 5)
3	To carry out one of the following experimental projets: - Ferromagnetic materials characterization (hysteresis loops) (Project 3). - Neutron detection. Measue of the Thermal Neutron Flux of an Am-Be Neutron Source (Project 4). - Advanced characterization of semiconductor lasers (Project 5). - Analysis of a Luminous Signal with Deterministic Profile by Using Photon Counting Techniques (Project 1)
4	To carry out one of the following experimental projets: - Analysis of a Luminous Signal with Deterministic Profile byUsing Photon Counting Techniques (Poject 1). - Shack-Hartmann Wavefront Sensor (Proyect 2). -Ferromagnetic materials characterization (hysteresis loops) (Project 3). - Advanced characterization of semiconductor lasers (Project 5)

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Continuous Evaluation	Others	No	Yes	12,00
Continuous Evaluation	Others	No	Yes	88,00
TOTAL				100,00

Observations

METHODOLOGY
- The students will be divided into several groups that will be organized at the beginning of the semester.
- Each student will carry out four projects selected by the encharged person of the subject.
- The student will have to write down a report, in English, of any of the finished projects. The report will be delivered to the corresponding teacher.
- Each student will perform a public oral presentation on a particular project that will be selected by the responsible of thesubject.

EVALUATION
- The deadline for each report will be one week from the end of the last session of the corresponding project. There will be a penalty of 1 over 10 points for delays up to one week, 3 over 10 points for delays up to 2 weeks and a further delay will involve a mark of 0 on that project, although it will still be compulsory to submit the report.
- The oral presentation will be compulsory for all the students.
- It will be compulsory to submit the reports on the four projects to pass the subject.
- The project including the oral presentation will weight 34% on the final mark.
- The rest of the projects will weight 22%, each one, on the final mark.

RE-EVALUATION
-To access the resit, the student has to complete the missing experiments to the expected number (4) under the conditions set by the teacher responsible for the projects. Then, the student has to pass a written test to be performed on schedule by the Center resit

Observations for part-time students

As far as possible, we will try to adapt schedules so that students can carry out the four experimetal projects.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Due to the specific characteristics of the present subject, the basic bibliography will be contained in the guide of eachproject that will be provided at the beginning of the course.