1. BASIC INFORMATION

Course	Experimental Project II
Degree program	Degree in Physics
School	School of Science, Engineering and Design
Year	2023/2024
ECTS	6
Credit type	Mandatory
Language(s)	English
Delivery mode	Campus based mode
Semester	S6
Academic year	3
Coordinating professor	Ezequiel Valero Lafuente
Professor	Ezequiel Valero Lafuente Ruth de los Reyes Cánovas

2. PRESENTATION

The Experimental Project II course is developed during the second semester of the third year of the Physics Degree and is the natural continuation of the Experimental Project I course.

The main objective of this course is to reinforce the knowledge of different subjects of the degree, especially Solid State Physics and Electronic Physics. Thus, the students are already introduced to the use of advanced characterization techniques such as X-Ray Diffraction, X-ray Diffraction and X-ray Diffraction.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CG1 - To know the most important concepts, methods and results of the different branches of Physics, together with some historical perspective of their development.
- CB3 - That students could gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.
- CB4 - That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences. specialized and non-specialized audiences.
- CB5 - That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

Cross-curricular competencies:

- CT2 - Autonomous learning: Set of skills to select strategies for search, analysis, evaluation and management of information from different sources, as well as to learn and put into practice independently what has been learned.
- CT4. Written communication / Oral communication: Ability to transmit and receive data, ideas, opinions and attitudes to achieve understanding and action, being oral that which is done through words and gestures and written, through writing and / or graphic supports.
- CT5 - Analysis and problem solving being able to critically evaluate information, decompose complex situations into their constituent parts, recognize patterns and consider other alternatives, approaches and perspectives to find optimal solutions and efficient negotiations.
- CT6. Adapting to change: Being able to accept, value and integrate different positions, adapting one's approach as the situation requires, as well as working effectively in situations of ambiguity.

Specific competencies:

- CE01 - To understand the processes of obtaining physical fundamentals and applications of materials.
- CE02 - Describe and analyze physical systems, identifying the fundamental concepts and principles in order to make the necessary approximations to build a simplified model.
- CE04 - Understand and explain the laws and principles of Physics, identify their logical and mathematical structure, their experimental support and the phenomena described through them.
- CE05. - Understand and know how to use the mathematical and numerical methods used in Physics and in the handling of experimental data.
- CE06 Understand, analyze and know how to use the most important experimental models, as well as to perform experiments independently, describing, analyzing and critically evaluating the experimental data.
- CE09 - Understand the processes of obtaining, the physical foundations and the applications of materials.

Learning outcomes:

- RA1 - Follow the protocols for taking measurements, particularly those related to the safety of the experimenter.
- RA2 - Perform a correct treatment of systematic and random errors that may affect an experiment.
- RA3 - Understand the operation of measuring instruments, computer equipment and software used in various fields of Physics, being able to calibrate and / or configure the systems.
- RA4 - Understand the ethical codes inherent to the process of scientific dissemination, ensuring the reproducibility and reliability of the data.
- RA5 - Collaborate effectively in an experimental working group to design and implement a scientific-technical project.

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CE02, CB3, CB5, CT4	RA1- Follow the protocols for taking measurements, particularly those related to the safety of the experimenter.

CG1, CB5, CT5, CE01,CT4, CE02, CE04	RA2 - Perform a correct treatment of systematic and random errors that may affect an experiment
CB4, CB5, CT5, CE04,CT4, CE09	RA3 - Understand the operation of measuring instruments, computer equipment and software used in various fields of Physics, being able to calibrate and / or configure the systems. .
CB4, CB5, CT5, CE04,CT4, CE09	RA4 - Understand the ethical codes inherent to the process of scientific dissemination, ensuring the reproducibility and reliability of the data. RA5 - Collaborate effectively in an experimental working group to design and implement a scientific-technical project.

4. CONTENT

1. Electromagnetism Laboratory.

2. Solid State Physics Laboratory.

3. Electronic Instrumentation Laboratory.

4. Integrating project. and experimental work to design and implement a scientific-technical project.

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Cooperative learning: students learn to collaborate with other people (classmates and teachers) to solve in a creative, integrative and constructive way the questions and problems identified from the cases posed, using the knowledge and material resources available.
- Problem-based learning: Problems will be posed with the objective that students solve them working in teams or individually.
- Master Class: presentations made by the teacher with the necessary technological tools for the maximum understanding of the concepts taught.
- Directed academic activities: more autonomous, individual and group work, with information search, written synthesis and debates and public defense of work.

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Master class	22
Oral presentations of work and debates	13
Preparation of reports	10
Formative evaluation	5
Practical activities	20
Tutoring	6
Self learning	74
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Laboratory practice reports	30
Integrative project report	20
Oral defense laboratory practice	10
Oral defense of integrative project	10
Individual knowledge test	15
Performance observation	15

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 5.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

To be eligible to take the first period evaluation exam, attendance at in-person classes must be 50% or higher. Attendance must be in person. Synchronous virtual attendance via HyFlex is only counted in cases that are approved and justified by the university.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 5.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Laboratory reports	Every two weaks
Final project	At the end of the cours
Oral presentation	At the end of the course
Final test	First exam period

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. REFERENCES

The main reference work for this subject is:

- Taylor J. R., An introduction to error analysis, University Science Books (1997).

The recommended Bibliography is:

- E. Bright Wilson, An introduction to scientific research, 1ª edición, McGraw-Hill, 1952

10. EDUCATIONAL GUIDANCE DIVERSITY AND INCLUSION UNIT

From the Educational Guidance, Diversity and Inclusion Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students'

inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunity for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa.uev@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.

WORK PLAN FOR THE COURSE

HOW TO COMMUNICATE WITH YOUR PROFESSOR

Whenever you have a question about the content or activities, don't forget to post it to your course forum so that your classmates can read it.

You might not be the only one with the same question!

If you have a question that you only want to ask your professor, you can send him/her a private message from the Campus Virtual. And if you need to discuss something in more detail, you can arrange an advisory session with your professor.

It's a good idea to check the course forum on a regular basis and read the messages posted by your classmates and professors, as this can be another way to learn.

SCHEDULE ACTIVITIES

This table shows the delivery deadline for each assessable activity in the course, as well as the delivery dates:

Week	Contents	Learning activities /Assessables	Weight of evaluable activity	ODS	Academic model
1	Course introduction and first practice	Practical exercises about the theoretical aspects	5	4	Professional environments, transdisciplinary
4-15	Submission of practices reports		30	4	Data driven, transdisciplinary, professional environments
11-12	Oral defense of practices		15	4,6,9	Professional environments
Last week	Submission of project report		20	4,6,9	Profesional environments
Last week	Oral defense of the project		15	4,6,9	Simulated environments. Data driven.
Final test	Individual knowledge test		20	4	Profesional environment

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

DESCRIPTION FOR ASSESSMENT ACTIVITIES

The activities described below are subject to slight changes in scheduling and/or modification of the contents at the

content modification at the teacher's discretion, in order to optimize the overall monitoring of the class and respecting the competencies and learning

the global monitoring of the class and respecting the competencies and learning outcomes to be achieved by the student.

the student:

Activity 1. - Practical reports: all experimental laboratory practices will consist of the delivery of a practical report. delivery of an internship report. The deadline will be two weeks from the completion of the practice.

Activity 2. - Oral defense of the practical: after the realization of the practicals, the first part of the course will be the first part of the course will end, in a single session, with a series of presentations of five minutes of duration in which the students will present in which the students will present to their classmates the results of their work with the last the results of their work with the last of the assemblies they have worked on. This is intended to practice the student's oral presentation skills before the defense of the integrative project. project. The evaluation of this activity will be carried out jointly by the rest of the class ('peer-review'). rest of the class ('peer-reviewing') and by the teacher.

Activity 3. Integrating project: in the second part of the course, a project of optical design applied to lighting technology will be carried out with the collaboration of the company 'Candeltec'.
optical design applied to lighting technology with the collaboration of the company 'Candeltec'.
At the beginning of the module, an initial theoretical class will be given on lighting technology and on the use of photometric and photometric simulation of components and products, where the projects to be solved will be introduced. The projects to be solved from then on by the students will be introduced. After the Christmas vacations, a final project report will be delivered, and an oral presentation will be made on the work done. An oral presentation on the work done.

Ativity 4. - Written tests of knowledge: it is an indispensable requirement to pass the course
to obtain a minimum of 4 points out of 10 in the written test. The final test may include the contents of both parts of the course and 'Basic Experimental Techniques'.

RUBRICS FOR ASSESSMENT ACTIVITIES

- **Rubric for the evaluation of the speaking skills.**

	0-3	3-5	5-8	8-10
Structuring of the information in the presentation.	The structure of the information in the presentation is very deficient, lacking most of the of the contents of the report are missing	The structure of the information in the presentation is deficient.	The structure of the information in the presentation is flawed defects	The structure of the information in the presentation is excelent
Clarity and organization in the oral presentation of the contents	The exposition of contents are done in a confusing disorganized and disjointed.	The exposition of content is difficult to follow difficult to follow, but it is understandable as a whole.	The exposition of content is difficult to follow clear, but could be improved as to the order in which of the concepts.	The exposition of contents are is done in a clear and organized a (totally) clear and organized way, which makes it easy to understand.
Speaking skills	The student does not use the body language in his presentation and does not keep eye contact with the audience	The student use few speaking skills in the presentation	The student use speaking skills in the presentation	The student use huge speaking skills in the presentation

- **Rubric for the evaluation of internship reports and the integrative project.**

	1	2	3	4
Organization and sections of the report	The sections are not clearly identified or separated, and the structure is not logical.	Some sections are not clearly identified or separated. The structure has some logical gaps.	The sections are clearly identified and well separated. The structure is mostly logical with minor gaps.	The report is coherent in all sections and maintains logical order.
Final result	The explanation of the final result is not clearly justified and does not match the expected procedure.	The explanation of the final result follows the procedure, but there are no justifications for it.	Most of the final result is well explained, matching the procedure and partially justified.	The final result is well explained, matching the procedure and fully justified.
Problem-solving procedure and solution mechanics	There is no consistency between the problem-solving procedure and the solution mechanics, which have errors in the execution.	The problem-solving procedure and the solution mechanics are aligned, but there are errors in the execution.	The problem-solving procedure and solution mechanics are mostly correct with minor errors.	The problem-solving procedure and solution mechanics are fully correct.
Order and format	The report does not follow the expected format or maintain a logical order.	The report follows the format but does not maintain logical order throughout.	The report follows the expected format and order, but there are some minor details to correct.	The report follows the format and logical order completely and without errors.

Diagrams and graphics	The diagrams and graphics are not appropriate or are missing.	The diagrams and graphics are partially correct but lack clarity and precision.	The diagrams and graphics are mostly correct, though they lack minor details for better clarity and precision.	The diagrams and graphics are correct, clear, and precise, supporting the arguments presented.
Justification of results and data	The explanation of the results lacks justification and does not refer to the procedure.	The explanation of the results is partially justified but does not fully align with the procedure.	The explanation of the results is mostly justified, aligned with the procedure, but with minor omissions.	The explanation of the results is fully justified, aligned with the procedure, and includes supporting documentation.

PLAGIARISM REGULATION

In accordance with the current student disciplinary regulations at Universidad Europea:

- Plagiarism, in full or in part, of intellectual works of any kind, is considered a very serious offense.
- Very serious offenses relating to plagiarism and the use of fraudulent means to pass assessment tests shall result in exclusion from the exams for the relevant period, as well as the inclusion of the offense and its details in the student's academic record.
- The professor reserves the right to evaluate submitted assignments orally in case of suspicion of inappropriate use of artificial intelligence technologies. If the student cannot sufficiently defend their work, the assignments will be graded with a score of 0.