

## 63245 - Innovation and Classroom Research in Physics and Chemistry

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 63245 - Innovation and Classroom Research in Physics and Chemistry

**Faculty / School:** 107 - Facultad de Educación

**Degree:** 584 - Master's Degree in Teaching Compulsory Secondary Education  
596 - Master's Degree in Teaching, specialization in Physics and Chemistry

**ECTS:** 4.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The objective of the subject is for students to acquire competencies for the continuous improvement of their teaching practice, through the implementation of innovation proposals and the evaluation of the results, initiation in the handling of basic educational research tools and permanent didactic updating within the framework of the subjects of Physics and Chemistry

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement, in specifically, to that of Goal 4.

### 2. Learning results

1. Recognize, describe and evaluate innovative teaching proposals in the field of Physics and Chemistry, identifying theoretical assumptions to which they respond and the problems related to teaching and learning that they try to solve.
2. Explain the most important approaches and methodologies to evaluate the educational activity in all its aspects and apply some of the most consolidated evaluation instruments to concrete teaching-learning situations.
3. Differentiate the different paradigms of educational research in the corresponding specialty and use them to evaluate research articles.
4. Know and effectively use bibliographic resources and documents related to educational innovation and research.

Evaluation is one of the essential elements of the teaching-learning process. Therefore, the design of both innovation activities and classroom research should contemplate diverse evaluation techniques and tools, that take into account the different learning modalities of students. Students should become familiar with these concepts and practices of innovation, research and evaluation. From a professional perspective, the students of this subject should be able to critically analyse the different relevant aspects of teaching practice, especially those that have more impact on the learning results of schoolchildren in physics and chemistry, being a good practice to implement in their future professional performance.

### 3. Syllabus

All activities are related to the following contents:

- **Educational innovation and research** in Physics and Chemistry Didactics and its impact on the process of teaching/learning. **Good practices and examples in Didactics of Experimental Sciences.**
- **Methods and tools for the evaluation** of the teaching/learning process of students.
- **Design, development and analysis** of educational innovation and research proposals.
- **Presentation and discussion** of these proposals.

### 4. Academic activities

The sessions will be face-to-face and will consist of the following activities:

**Introductory presentations to contextualize** innovation and research in Physics and Chemistry Didactics and its impact on the teaching-learning process, including evaluation tools and methods

**Analysis and discussion** of proposals and concrete experiences on innovation and research lines.

**Reading and discussion of** research and innovation **articles** in Science Education.

**Student presentations.**

Innovation and research project **designs** in physics and chemistry teaching.

The organization of conferences or seminars with guest speakers will be considered to facilitate the acquisition of the competences of the subject

Distribution of **hours**: Master Classes: 6h; Problem solving and case studies: 34h ; Study: 40h (not presential); Works: 18h ; Evaluation Test: 2h

The guidelines, structure and schedule of sessions, as well as the submission and presentation of papers will be shared on the U. Zaragoza Digital Teaching Ring at the beginning of the academic year. Specific materials and topics covered will be shared through the same platform.

## 5. Assessment system

**Assessment activities:**

- **Reports** of the activities carried out individually or in groups throughout the term together with the reflections based on the theoretical framework of the subject and the citations and bibliographical references consulted. **Active participation in the face-to-face seminars to share** the reports.

- **Design of an** innovation or research **project**, carried out individually, in which the student demonstrates their competence to elaborate creative and well-founded proposals. The maximum length will be between 10 and 15 pages and will be set by the teacher throughout the development of the classes. It must be defended during the term in the sessions established for this purpose, in a maximum of 10 minutes. The defence will include the sections developed in the proposal and will provide, if possible, a comparative assessment between the planned design and the one carried out in the Practicum phase. IT will also specify the didactic approach that justifies the assessment shown.

**Criteria:**

**Submission of assignments and class participation** (20% of the final grade): the grade will be calculated according to the participation in the activities and debates raised in class.

**Reports of the programmed activities** (30% of the final grade): they may be submitted throughout the term through the ADD and will be evaluated and graded according to criteria adapted to the typology of each one of them. These will be simple reports (length and format will be indicated by the teacher/s) that will include the results of the activities and/or the critical reflection on them. The following will be valued: Justification and argumentation, adequacy, clarity of the critical analysis, personal contributions, implication in the development of the referred tasks, existence of bibliographical and any other type of references.

**Innovation or research project** (25% of the final grade): For the evaluation of the didactic proposal, we will evaluate the report with the sections indicated in the ADD materials (out of 10 points).

**Presentation and defence of the didactic proposal included in the project** (25% of the final grade): it will be carried out during the last weeks of the term and must be defended within the maximum time established. For the evaluation of the presentation and defence of the innovation or research project, the following sections will be evaluated and published in the ADD material (out of 10 points).

COMPREHENSIVE TEST (for first and second calls) and FIFTH AND SIXTH call

Those students who have not passed the subject through the evaluation described in the previous section are entitled to take the global test. The overall test will consist of two parts: a written exam and an individual paper. If any of the two parts of the test has an individual grade higher than 5 points in the first call, that grade can be kept exclusively for the second call without having to take that part.

However, every student has the right to repeat the part passed in order to improve their grade.

**Written exam** (50% of the final grade): It will be held on the date established in the academic calendar. The test will be constituted by three or four questions in which they will relate practical and theoretical issues, so that the students will show their competence in the subjects of the subject. The answers will consist of a broad development of the topic ( essay or free and open response tests). Adequacy to what is being asked, completeness and clarity in the expression of the answers will be valued. Coherence, order and sufficient extension for the comprehension of what has been exposed. Synthesis capacity. Use of diagrams or illustrations that facilitate the understanding of what has been exposed. Use of the language proper to the field of Education and of the Didactics of Experimental Sciences.

**Individual work: Design of an innovation or research project** (50% of the final grade): carried out individually, in which the student demonstrates their competence to elaborate creative and well-founded proposals.

The maximum length will be between 10 and 15 pages and will be set by the teacher during the development of the classes.

**In order to pass the subject** it is necessary to obtain a minimum grade of 5 out of 10 in each of the parts that constitute the global test and the continuous evaluation. The students must comply with all the points set forth in section 2. A necessary condition to pass this subject is that the teacher of the subject has not submitted verifiable complaints to the coordinator of the specialty of behaviour, attitude or disrespect of the student towards their person or towards any of the classmates of the subject. In any case, as part of the evaluation, the teacher may request, at random, the oral defence of the test or assignment submitted

in writing, for the verification of the grade. Fraud or total or partial plagiarism in any of the evaluation tests will result in the failure of the subject with the minimum grade, in addition to the disciplinary sanctions that the Guarantee Commission adopts for these cases.

The approach, methodology and evaluation of this guide is prepared to be the same in any teaching scenario teaching scenario.

Finally, it must be taken into account that the Regulations of the Norms of Coexistence of the University of Zaragoza will be applicable to the irregularities committed in the evaluation tests by means of academic fraud, as well as the application of article 30 of the Regulations of the Norms of Evaluation of Learning in relation to irregular practices other than academic fraud.