

27201 - Introduction to The Chemistry Laboratory

Información del Plan Docente

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| Academic Year | 2017/18 |
| Faculty / School | 100 - Facultad de Ciencias |
| Degree | 452 - Degree in Chemistry |
| ECTS | 9.0 |
| Year | 1 |
| Semester | Annual |
| Subject Type | Basic Education |
| Module | --- |

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process that has been designed for this subject is based on the following:

The subject is practical (7 ECTS). Student learning is based primarily on work in the laboratory that must be accompanied by a previous preparation of the practices. That preparation receives support with some sessions of theory (1 ECTS) and seminars (1 ECTS). In order to guide the learning process, the student must carry out previous questionnaires of each practice that require reviewing and remembering necessary concepts. In addition, after completing the practices, the

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students must carry out other questionnaires or prepare scripts in which they analyze the data and make the calculations necessary to justify the obtained results and / or observed facts.

5.2.Learning tasks

The program offered to the student to help them to achieve the expected results includes the following activities:

Formative Activity 1: Acquisition of basic knowledge of work in the chemical laboratory (1 ECTS). Methodology: Master classes participatory.

Formative Activity 2: Problem resolution and case study analysis in small group of students (1 ECTS). Methodology: Problem-based learning and questions related to experimentation carried out in the laboratory.

Formative Activity 3: Study, planning, implementation, documentation and evaluation of laboratory practices (6 ECTS). Methodology: Individual study of the preparatory material, execution of the laboratory practice, elaboration of the practice script, and preparation of the answers to the attached questionnaires.

Formative Activity 4: Works of experimentation based on applied cases of properties or products chemicals in common use (1 ECTS). Methodology: Presentation of a problem applied with individual tutorials or in small groups followed by the execution of the practice in the laboratory and presentation and discussion of the obtained results.

5.3.Syllabus

The practical work to be done is:

1. Safety and basic work in the laboratory
2. Solution concentration. Strong and weak electrolytes.
3. Solution equilibria. Acid-base indicators. Acid-base reactions.
4. Preparation and properties of carbon dioxide. Obtaining of hydrogen and determination of the atomic weight of a metal.
5. Oxidants and reductants. Electron transfer reactions.
6. Study of the physical properties of some compounds based on types of chemical bonds.
7. Heat of neutralization.
8. Cryoscopy.
9. Reaction kinetics between peroxodisulfate and iodine ions.
10. Study of the main properties of the elements in the groups 1, 2 and 17 and identification of their salts.

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11. Qualitative analysis (I): Identification of Cu²⁺, Cd²⁺ and Ni²⁺.
12. Qualitative analysis (II): Identification of Ag⁺, Co²⁺, Cr³⁺ and Zn²⁺.
13. Qualitative analysis (III): Identification of Cl⁻, Br⁻, SO₄²⁻ and PO₄³⁻.
14. Liquid-liquid extraction. Isolation of caffeine from a cola soft-drink. Qualitative study of the a simple vs a multiple extraction.
15. Recrystallization. Purification of solid samples.
16. Simple distillation. Separation of a mixture of miscible liquids.
17. Thin layer chromatography (TLC). Identification of organic compounds by TLC.
- 18-20. Experiments with daily use products.

5.4.Course planning and calendar

| ACTIVITY | TOTAL HOURS |
|-----------------------|----------------|
| | Teaching hours |
| a. Master class | 10 h |
| b. Problem solving | 10 h |
| c. Practical sessions | 70 h |
| d. Exam | 4 h |
| Total (225 h) | 94 h |

Lectures, practical sessions and examination dates will follow the scheduling fixed by the Science Faculty, which is published in its website (<https://ciencias.unizar.es/calendario-y-horarios>) and in the learning platform Moodle within the *Introducción al Laboratorio Químico* course.

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5.5. Bibliography and recommended resources

- BB** Consultar información/recursos incorporados en el ADD de la asignatura
- BB** Csák, Aurelio G.. Técnicas experimentales en síntesis orgánica / Aurelio G. Csák, M^a Angeles Martínez Grau . 2^a ed. corr. y amp. Madrid : Síntesis, 2012
- BB** Woodfield, Brian F.. Laboratorio virtual de química general / Brian F. Woodfield, Matthew C. Asplund, Steven Haderlie ; traducción María Teresa Aguilar Ortega ; revisión técnica Gonzalo Trujillo Chávez, Adriana Gómez Macías . 3^a ed. México [etc.] : Prentice Hall, 2009