

## 27201 - Introduction to The Chemistry Laboratory

### Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	452 - Degree in Chemistry
ECTS	9.0
Course	1
Period	Annual
Subject Type	Basic Education
Module	---

### 1. Basic info

#### 1.1. Recommendations to take this course

#### 1.2. Activities and key dates for the course

### 2. Initiation

#### 2.1. Learning outcomes that define the subject

#### 2.2. Introduction

### 3. Context and competences

#### 3.1. Goals

#### 3.2. Context and meaning of the subject in the degree

#### 3.3. Competences

#### 3.4. Importance of learning outcomes

### 4. Evaluation

### 5. Activities and resources

#### 5.1. General methodological presentation

#### 5.2. Learning activities

#### 5.3. Program

The practical work to be done is:

1. Safety and basic work in the laboratory

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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.
11. Qualitative analysis (I): Identification of  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$  and  $\text{Ni}^{2+}$ .
12. Qualitative analysis (II): Identification of  $\text{Ag}^{+}$ ,  $\text{Co}^{2+}$ ,  $\text{Cr}^{3+}$  and  $\text{Zn}^{2+}$ .
13. Qualitative analysis (III): Identification of  $\text{Cl}^{-}$ ,  $\text{Br}^{-}$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$ .
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.Planning and scheduling

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

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.

### 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<sup>a</sup> Angeles Martínez Grau . 2<sup>a</sup> 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<sup>a</sup> ed. México [etc.] : Prentice Hall, 2009