

<b>POLI</b> <b>ESCOLA SUPERIOR</b> <b>SAÚDE</b> <b>TÉCNICO</b> <b>GUARDA</b>	<b>SUBJECT DESCRIPTION</b>	<b>MODELO</b> PED.015.03
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Course	Pharmacy					
Subject	Laboratory Practices in Pharmacy					
Academic year	2023/2024	Curricular year	1st	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 135	Contact: 75	ECTS	5.0
Professor(s)	André Ricardo Tomás dos Santos Araújo Pereira Carla Sandra Mota Castro					
<input type="checkbox"/> Area/Group Coordinator <input checked="" type="checkbox"/> Head of Department			(select)	André Ricardo Tomás dos Santos Araújo Pereira		

## PLANNED SUBJECT DESCRIPTION

### 1. LEARNING OBJECTIVES

- O1 – Observe the rules of safety and good practices in the laboratory;
- O2 – Understand the importance of good laboratory practices in the field of Pharmacy;
- O3 – Understand and handle all equipment and laboratory equipment;
- O4 – Reinforce the calculation of chemical concentrations and recognize the experimental error;
- O5 – Know the operations of general use in Pharmacy;
- O6 – Provide students with tools at the level of bioanalysis in Pharmacy, namely in the preparation of biological samples and in the determination of analytes through the main analytical methods;
- O7 – Perform accurately procedures in practical and laboratory classes;
- O8 - Build reports of the activities developed in the laboratory classes.

### 2. PROGRAMME

*Theoretical contents*

- 1) Safety and good laboratory practices
- 2) Materials and laboratory equipment
- 3) Chemical measurements
- 4) Experimental error.
- 5) Operations commonly used in Pharmacy.
- 6) Bioanalysis in Pharmacy:
  - 6.1.) Preparation of biological samples
  - 6.2.) Analytical methods:
    - 6.2.1.) Spectrophotometry
    - 6.2.2.) Potentiometry
    - 6.2.3.) Chromatography
  - 6.3.) Validation of analytical methods

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#### Laboratory contents

- Measures of mass, volumes and densities
- Preparation of solutions and dilutions
- pH measurement
- Titrations
- Preparation of biological samples
- UV/Visible and IR spectrophotometry and chromatography
- Treatment of laboratory data

### 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

With the study of the different programme contents, it is intended to attain the proposed objectives. With the point 1) it is intended to attain the objective O1 and O2; with the point 2) the objective O3; with the points 3) and 4) the objective O4, and with points 5) e 6) the objectives O5 and O6.

In conducting any laboratory experiment, students have to sequentially and in an organized manner, select the materials and the necessary laboratory equipment for the proposed activity, knowing them properly so that they could use them properly (O3 and O7), identifying errors associated with measurements taken with them (O4). Students have to prepare reports corresponding to the laboratory work performed (O8).

### 4. MAIN BIBLIOGRAPHY

Harris, D. C. (2017) *Análise química quantitativa (9ª edição)*. LTC.

Gonçalves, M. Lurdes S. S. (2001) *Métodos Instrumentais para análise de soluções – Análise quantitativa (3ª edição)*, F.C.G.

Vogel, A. I., Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K. (2002) *Vogel - Análise Química Quantitativa (6ª edição)*. LTC

Simões, J. A., et al. (2017) *Guia de Laboratório de Química e Bioquímica, (3ª edição)*. Lidel

Pinto, M. (2011), *Manual de Trabalhos Laboratoriais de Química Orgânica e Farmacêutica*, Lidel.

Araújo, A.R.T.S., "Práticas Laboratoriais em Farmácia – Notas de apoio das aulas" (2022/2023).

### 5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The evaluation consists of a continuous evaluation, one written test, in addition to the assessment of laboratory activities performed.

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*The evaluation of the theoretical and theoretical-practical component is constituted by the mark of the written test, of the respective contents taught, with a weighting of 65% in the final average, with a minimum grade of 7.5. The evaluation of the continuous assessment, with a weighting of 5%, results from the participation in classes and the resolution of exercises and worksheets. The evaluation of practical-laboratory component, with a weighting of 30%, results from performance and reports of the planned laboratory works.*

*The approval of CU is achieved with a final grade of at least 9.5, on a scale 0-20.*

## **6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES**

*The teaching methodologies are consistent with the objectives of the curricular unity.*

*Lectures with a more expositive methodology, with the masterly exposition of the contents, proceeding to the systematization of the most relevant and current aspects, always intended participative, are the first approach of the contents, where students are encouraged to ask questions, and make reasoning based on their prior knowledge and also in the knowledge that they will acquire during the semester. In theoretical-practical classes it will be focused on interactive discussion with the students to enable the application of theoretical knowledge in an integrated way. This theoretical training will be completed with the attendance of the student at the laboratory practical classes, where it could prove the most relevant of the theoretical aspects.*

*Problem solving, discussion of practical cases, and the realization of experimental protocols in laboratory classes promote student responsibility in handling equipment, instruments and materials and enable students to develop scientific reasoning, integration of knowledge, stimulate the critical thinking and to consolidate the objectives related with attitudes and behaviors.*



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## 7. ATTENDANCE

*Approval in this curricular unit requires the participation and attendance, with mandatory attendance of at least 75% of theoretical-practical and laboratory practical classes.*

## 8. CONTACTS AND OFFICE HOURS

*André Ricardo Tomás dos Santos Araújo Pereira: andrearaujo@ipg.pt*

*Office 9*

*Office hours - Tuesday: 10:00-12:00; Thursday: 9:30-11:30*

*Carla Sandra Mota Castro – carla.castro@ipg.pt*

*Office 7*

*Office hours – Wednesday: 14:00-16:00; Thursday: 11:00-13:00*

## 9. OTHERS

*Students must comply with the safety rules in the lab, which will be indicated in the first laboratory class.*

## DATE

**9 de outubro de 2023**

## SIGNATURES

*Professor(s), Area/Group Coordinator or Head of Department signatures*

Professor

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(signature) *Carla Castro*

Head of Department

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(signature) *André Ricardo Tomás dos Santos Araújo Pereira*