

POLI ESCOLA SUPERIOR SAÚDE TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.015.03
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Course	Pharmacy					
Subject	Toxicology					
Academic year	2023/2024	Curricular year	3rd	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 121.5	Contact: 60	ECTS	5.0
Professor(s)	André Ricardo Tomás dos Santos Araújo Pereira Carolina Isabel Moura Micaelo Pinheiro Tiago Santos Barata					
<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- understand fundamental concepts of Toxicology;*
- O2 – understand the basics of toxic action and the factors that modify it;*
- O3 – understand and identify the principles for assessment of the toxicity of the compounds and understand the importance of the risk assessment;*
- O4 - emphasize the importance of toxicokinetics and the factors that modulate it and its implication in the toxicity of xenobiotics;*
- O5 – know the main mechanisms of toxicity;*
- O6 – know the bases of diagnosis and treatment of poisoning.*
- O7 – identify the groups of compounds most involved in poisoning;*
- O8 – recognize the importance of forensic toxicology in medico-legal purposes.*

2. PROGRAMME

THEORETICAL CONTENT

- 1) Fundamentals of Toxicology
- 2) Dose-response relationship
- 3) Evaluation of the toxicity of compounds from a regulatory perspective
- 4) Toxicokinetic and toxicodynamic factors that determine toxicity. The importance of biotransformation
- 5) Toxicity mechanisms: Cellular and molecular mechanisms of toxicity
- 6) Clinical toxicology.
- 7) Toxic agents: Solvents and vapors; Metals; Pesticides; Drugs and Drugs of Abuse
- 8) Forensic toxicology

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LABORATORY CONTENT

- Identification and quantification of xenobiotics in biological and/or environmental matrices
- Analysis of adulterants in drugs of abuse in suspected samples
- Research on toxic substances in the context of clinical/forensic toxicology: case analysis

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; with the points 2) and 3) the objectives O2 and O3; with the point 4) the objective O4; with the point 5) the objective O5;

with the points 6) and 7) the objectives O6 and O7; and point 8) the objective O8.

In this Curricular Unit it is addressed the specific terminology associated, it is identified the factors that influence the toxicity of xenobiotics, it is studied the interaction between xenobiotics and target molecules, it is identified the phases of toxic action, with particular emphasis to the biotransformation of xenobiotics (points 1) to 4) and O1-O4). It is also exploited the main mechanisms of toxicity, immediate and long-term toxic effects and supportive therapeutic actions (points 5) to 7) and O5-O7), as well as the forensic toxicology (point 8) and O8).

4. MAIN BIBLIOGRAPHY

Klaassen, C.D. (2013) Casarett & Doull's, *Toxicology: The Basic Science of Poisons* (8ª Edição), McGraw-Hill.

Dinis-Oliveira, R. Carvalho, F. & Bastos, M. L. (2018), *Toxicologia fundamental*. Lidel.

Timbrell, J. (2009), *Principles of Biochemical Toxicology* (4ª Edição) Informa Healthcare.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The curricular unity includes theoretical, theoretical-practical and practical components.

The evaluation of the theoretical component will be constituted by two written tests, with a weighting of 65% in the final average. The evaluation theoretical-practical component results from the work group and the respective poster presentation, with a weighting of 15%, and the evaluation of practical-laboratory component, with a weighting of 15%, results from performance and reports of the planned laboratory works and the analysis of clinical cases of intoxication, and the continuous evaluation, with a weighting of 5%.

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The approval of CU is achieved with a final grade of at least 9.5, on a scale 0-20, obtained from the sum of the partial averages. If the student is not approved in the continuous assessment, he/she performs an exam, scheduled in defined dates. The mark obtained in the theoretical-practical and practical-laboratory component during continuous assessment is kept during the examination period, both at the regular and resource times.

All students who have met the continuous assessment parameters and whose grade in the continuous assessment has not complied with the above mentioned will be admitted to the examination.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The teaching methodologies are consistent with the objectives of the CU.

Theoretical lectures with a more expositive methodology, although always participative, are the first approach of the contents, where students were encouraged to ask questions, and make reasoning based on the knowledge they acquired during the semester, are essential to achieve the objectives related to knowledge and memorization of concepts.

On the other hand, in the TP classes where exercises are solved, practical cases are discussed and documents and scientific papers are analysed, related to knowledge acquired in lectures, enabling a continuous critical thinking in problem solving, are important to achieve the objectives, related with programme content taught.

The PL classes consist in the preparation in the work group and in the realization of laboratory protocols classes, which promotes student responsibility in handling equipment, instruments and materials and enable students to develop autonomy and to consolidate the objectives related with attitudes and behaviors.

It is also performed active learning activities with integrated questions to encourage the students to discuss and to clarify some topics.

The literature is complemented by the suggestion of reading scientific papers tailored to each content.

The written evaluation, with direct and development questions, allows to evaluate the knowledge acquired and developed by students, and theoretical-practical and practical evaluation allows the integration of knowledge and therefore enabling students to develop critical thinking and apply the acquired knowledge, through discussion and presenting the work in a oral communication in PowerPoint and performing the laboratory works.

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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

Carolina Isabel Moura Micaelo Pinheiro: carolinacmmp@ipg.pt

Office hours – Friday: 16:00-17:00

Tiago Santos Barata: tiago.barata@ipg.pt

Office hours – Friday: 14:00-15:00

9. OTHERS

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

DATE

13 de outubro de 2023

SIGNATURES

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

Professor

Carolina Isabel Moura Micaelo Pinheiro
(signature)

Professor

Tiago Santos Barata
(signature)

Head of Department

André Ricardo Tomás dos Santos Araújo Pereira
(signature)