Course Unit	Laboratory analysis techniques			Field of study	Physical Sciences
Master in	Natural Products and Bioprospecting			School	School of Agriculture
Academic Year	2023/2024	Year of study	1	Level	2-1
ECTS credits	6.0				
Type	Semestral	Semester	1	Code	5012-740-1105-00-23

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			30	-	30	-	-	-	4	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): António Manuel Coelho Lino Peres, Tayse Ferreira Ferreira da Silveira

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Sampling and sample treatment as fundamental in the analytical process.
2. Design and perform sampling processes.
3. Understand the instrumentation and know how to interpret the information obtained from various analytical methods.
4. Understand the advantages and disadvantages of each technique.
5. Identify the qualitative and quantitative capabilities of each technique.
6. Acquire critical analytical and integrative skills in laboratory work.

Prerequisites

Before the course unit the learner is expected to be able to:
1. Knowledge of general inorganic and organic chemistry.
2. Knowledge of analytical chemistry
3. Fundamentals of instrumental methods of analysis.

Course contents

dentify and recognize sampling techniques and sample treatment. Understand the instrumentation of various analytical techniques and methods, and know how to interpret information obtained from different analytical methods. Comprehend the advantages and disadvantages of each technique. Acquire knowledge about the qualitative and quantitative applications of each technique.

Course contents (extended version)

1. Sampling and sample treatment for analysis.
2. Separation Methods: - Gas Chromatography - Liquid Chromatography and Thin-Layer Chromatography.
3. Spectrophotometric Methods - Ultraviolet-visible, Fluorescence, and Phosphorescence.
4. Application of Infrared Spectroscopy (NIR and MIR).
5. ntroduction to Mass Spectrometry.

Recommended reading

1. D. P. Pavia, G. M. Lampman, G. S. Kriz, J. R. Vyvyan, Introduction to Spectroscopy, Brooks/Cole, Cengage Learning, 2009
2. Ham B.M., MaHam A. Analytical Chemistry: A Chemist and Laboratory Technician's Toolkit, John Wiley & Sons, Inc, 2016
3. Harris D.C. Quantitative Chemical Analysis, W. H. Freeman and Company, 2016
4. Picó, Y. Análise química dos alimentos: Técnicas, Campus, 2014
5. Lanças, F. Espectrometria de Massas: Fundamentos, Instrumentação e Aplicações, Átomo, 2019

Teaching and learning methods

Theoretical in-person classes for acquiring concepts of instrumental methods of analysis. Practical in-person classes for solving analytical problems and applying theoretical concepts related to analytical techniques, execution of practical laboratory work. Integration of knowledge through the preparation of reports on practical work.

Assessment methods

1. Exam - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100% (Final written exam)
2. -Exam and Laboratorial Work - (Regular, Student Worker) (Final, Supplementary)
   - Final Written Exam - 70% (Final written exam)
   - Laboratory Work - 15% (Laboratorial works)
   - Presentations - 15% (Presentation of subjects)

Language of instruction

Portuguese

Electronic validation

António Manuel Coelho Lino Peres, Tayse Ferreira Ferreira da Silveira	Luís Avelino Guimarães Dias	Maria João Almeida Coelho Sousa	Maria Sameiro Ferreira Patrício
02-02-2024	04-02-2024	04-02-2024	05-02-2024