

Course Unit	e Unit Analytical Chemistry			Field of study			
Bachelor in	Pharmacy			School	School of Health		
Academic Year	2023/2024	Year of study	2	Level	1-2	ECTS credits 5.0	
Туре	Semestral	Semester	1	Code	9549-803-2105-00-23		
Workload (hours)	135	Contact hours	T - TP : T - Lectures; TP - Lectures a	30 PL 30 T	C - S - solving, project or laboratory; TC -	E - OT 7,5 O - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other	

Name(s) of lecturer(s)

Luís Avelino Guimarães Dias, Maria Sameiro Ferreira Patrício

Learning outcomes and competences

- At the end of the course unit the learner is expected to be able to: 1. To interpret the results of analytical chemistry by using the statistic. 2. To understand, apply the theoretical concepts of analytical chemistry and use the quality control in analytical measurement results.
- To know the instrumentation of various analytical methods and understand the physical principle that serves as a basis for the analytical technique.
 To know the instrumentation of various analytical methods and understand the physical principle that serves as a basis for the analytical technique.
 To understand the advantages and disadvantages of each technique and identify the qualitative and quantitative capabilities of the techniques.
 To plan, prepare laboratory experiments and apply the various methods of calibration.
 To acquire critical analytical capability and integration of knowledge in laboratory work.

Prerequisites

Not applicable

Course contents

Fundamentals of instrumental analysis. Methods of spectroscopy Electrochemical methods.

Course contents (extended version)

- 1. Fundamentals of instrumental analysis: Characterization of the experimental erro rand propagation of uncertainty.
 - Precision and Accuracy.

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 Significant figures.
 Methods of Calibration and validation of analytical methods.
 Quality control of analytical results.
 Selection of analytical method and interpretation of analytical data.
 Methods of Spectroscopy:
 Fundamentals of spectroscopy.
 Absorption spectroscopy: Illuraviolet-visible, infrared and atomic absorption.
 Emission spectroscopy: fluorescence, phosphorescence and luminescence spectrophotometry.
 Titrations and two or more substances simultaneous analysis
 Instrumentative and qualitative applications. Instrumentation, quantitative and qualitative applications, advantages and disadvantages.
 Electrochemical methods:
- Fundamentals of Electrochemical.
 Chemical sensors and biossensors.
- Potentiometry: indicators and reference electrodes.
 Potentiometric titrations.
- Concepts of voltammetry and polarography. Conductimetry
- Instrumentation, quantitative and qualitative applications, advantages and disadvantages

Recommended reading

- Rouessac, F. e Rouessac, A. (1998) Chemical Analysis: Modern Instrumentation Methods and Techniques, John Wiley & Sons
 Harvey, D. (2000) Modern Analytical Chemistry, McGraw-Hill
 Ewing, G. W. (2001) Métodos instrumentais de análise química, Edgard Blucher
 Patnaik, P. (2004) Deans's Analytical Chemistry Handbook, McGraw-Hill
 Barnes, J. D., Denney, R. C., Mendham, J., Thomas, M. J. K. (2002) Vogel análise química quantitativa, ed. LTC Livros Técnicos e Científicos Editora Lda

Teaching and learning methods

Lectures for the acquisition of concepts of analytical chemistry and instrumental methods of analysis. Practical/theoretical-practical lessons of: problem-solving and analytical application of theoretical concepts, practical implementation of laboratory work and developing an analytical method using a scientific article. Preparation of reports of practical work.

Assessment methods

- Assessment of the theoretical component. (Regular, Student Worker) (Final, Supplementary, Special)

 Final Written Exam 70% (The theoretical component will be held for examination.)
 Laboratory Work 30% (The practical component will be measured taking into account the evaluation of written reports.)

 Theoretical and theoretical-practical evaluation. (Student Worker) (Final, Supplementary, Special)

 Final Written Exam 100% (Situation provided for the working student or other situation covered in the Regulations of IPB.)

Language of instruction

Portuguese

Electronic validation			
Luís Avelino Guimarães Dias, Maria Sameiro Ferreira Patrício	Isabel Cristina Jornalo Freire Pinto	Ana Maria Nunes Português Galvão	Adília Maria Pires da Silva Fernandes
13-11-2023	15-11-2023	15-11-2023	21-11-2023