

Course Unit	Analytical Chemistry	Field of study	Chemistry
Bachelor in	Pharmacy	School	School of Health
Academic Year	2022/2023	Year of study	2
Type	Semestral	Semester	1
Level	1-2	ECTS credits	5.0
Code	9549-644-2105-00-22		
Workload (hours)	135	Contact hours	T - TP 30 PL 30 TC - S - E - OT 7,5 O -

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) Luís Avelino Guimarães Dias, Maria Ines Moreira Figueiredo 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.
3. To know the instrumentation of various analytical methods and understand the physical principle that serves as a basis for the analytical technique.
4. To understand the advantages and disadvantages of each technique and identify the qualitative and quantitative capabilities of the techniques.
5. To plan, prepare laboratory experiments and apply the various methods of calibration.
6. 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 error and propagation of uncertainty.
 - Precision and Accuracy.
 - Significant figures.
 - Methods of Calibration and validation of analytical methods.
 - Quality control of analytical results.
 - Selection of analytical method and interpretation of analytical data.
2. Methods of Spectroscopy:
 - Fundamentals of spectroscopy.
 - Absorption spectroscopy: ultraviolet-visible, infrared and atomic absorption.
 - Emission spectroscopy: fluorescence, phosphorescence and luminescence spectrophotometry.
 - Titrations and two or more substances simultaneous analysis
 - Instrumentation, quantitative and qualitative applications, advantages and disadvantages.
3. Electrochemical methods:
 - Fundamentals of Electrochemical.
 - Chemical sensors and biosensors.
 - Potentiometry: indicators and reference electrodes.
 - Potentiometric titrations.
 - Concepts of voltammetry and polarography.
 - Conductimetry.
 - Instrumentation, quantitative and qualitative applications, advantages and disadvantages.

Recommended reading

1. Rouessac, F. e Rouessac, A. (1998) Chemical Analysis: Modern Instrumentation Methods and Techniques, John Wiley & Sons
2. Harvey, D. (2000) Modern Analytical Chemistry, McGraw-Hill
3. Ewing, G. W. (2001) Métodos instrumentais de análise química, Edgard Blucher
4. Patnaik, P. (2004) Deans's Analytical Chemistry Handbook, McGraw-Hill
5. 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

1. 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.)
2. 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

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09-11-2022	15-11-2022	15-11-2022	15-11-2022