UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Course Code	**Course Title**	**Credits (ECTS)**
PHAR-220	Classical Analytical Chemistry/Κλασσική Αναλυτική Χημεία	6
Department	**Semester**	**Prerequisites**
Life & Health Sciences	Fall	None
Type of Course	**Field**	**Language of Instruction**
Required	Pharmacy	Greek/English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	2nd year	Stavroula Y. Christou/Yiota Gregoriou

Objectives of the Course:

The main purpose of the course is to provide students with a strong theoretical and practical grounding in the principles and practices of analytical chemistry, including classical and instrumental analytical techniques. This course also aims to develop advanced laboratory skills in analytical chemistry.

The aims of this module are to enable students to:

- develop the ability to think analytically
- improve manipulative skills
- design an analytical scheme and validate it
- use analytical instruments to help solve analytical problems
- interpret and handle analytical data

Learning Outcomes:

After completion of the course students are expected to:

- Understand and be able to apply the fundamental principles of analytical chemistry.
- Logically approach environmental analysis and develop appropriate strategies to overcome problems encountered in quantification of sample species.
- Demonstrate an understanding of the application of and use of different methods of analysis.
- Competentlyundertakeadvancedqualitativeandquantitative laboratory tasks.
- Demonstrate the ability to follow the analytical approach to the solution of problems in chemical analysis and adhere to good laboratory practice.
- Be able to present and interpret scientific data in a clear, concise and unambiguous manner.
- Be able to understand and follow standard documented methods of analysis.

After completion of the course students are expected to:

- appreciate the fundamental concepts of modern analytical science
- understand the process of an analysis from instrument calibration and sample preparation to data analysis
- discuss the principles of gas and liquid chromatography and atomic and molecular spectroscopy
- prepare samples
- apply statistical techniques to quantitative data
- calibrate instruments
- design an analytical scheme
- use analytical instruments to help solve analytical problems
- interpret and handle analytical data
- appreciate the ethics relevant to the practice of science

Course Contents:

1. Introduction; the language of analytical chemistry.
2. Chemical equilibrium; reaction rates; equilibrium constant; le Châtelier's principle; activity effects; mass balance equation; charge balance equation; proton balance equation.
3. Acid-base equilibria; strong and weak acids and bases; water ionization; buffer solutions.
4.Qualitative analysis of cations and anions; reactions, separation, identification of cations and anions in mixtures, alloys and/or minerals.
5. Titrimetric methods of analysis; equivalence and end points; titration curves.
6. Titrations based on acid–base reactions; acid-base titration curves; qualitative and quantitave applications.
7. Formation of complexes; formation constant, K_f; titrations based on complexation reactions; complexiметric EDTA titrations; quantitave applications.
8. Redox reactions; electrochemical cells; redox equilibria and standard electrode potentials; the Nernst equation; titrations based on redox reactions; redox titration curves; quantitave applications.9. Precipitation reactions; solubility product, K_{sp}; ion product, Q_s; solubility equilibrium;precipitationtitrations;titrationcurves;quantitave applications.
10. Gravimetric analysis; steps and procedure; mechanism of precipitation.
11. Introduction to instrumental analysis; spectroscopic, electrochemical, and chromatographic analytical techniques.

Laboratory work:

Exercise 1: Preparation of solutions of defined concentrations;
Exercise 2: Qualitative analysis of cations;
Exercise 3: Qualitative analysis of anions;
Exercise 4: Acid-base titrations;
Exercise 5: Determination of water hardness by complexiметric EDTA titration;
Exercise 6: Gravimetric analysis of sulphates;
Exercise 7: Iodometric determination of copper.

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, laboratory

Assessment Methods:

Final Examination, Course work

Required Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
Δημήτριος Γ. Θεμελής	Βασικές Αρχές Αναλυτικής Χημείας	Εκδόσεις Ζήτη	2012	960-456-357-2
Στυλιανός Λιοδάκης	Αναλυτική Χημεία: Θέματα και Προβλήματα	Εκδόσεις Παπασωτηρίου	2001	960-7510-86-0
Skoog, West, Holler and Crouch	Analytical Chemistry: An introduction, seventh edition	Barrosse	2000	0-03-020293-0

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Θ. Π. Χατζηϊωάννου	Χημική Ισορροπία και Ανόργανη Ποιοτική Ημιμικροανάλυση	Ιδιωτική Έκδοση	2003	960-220-751-5
Γ. Κ. Παρισάκη	Βασικές αρχές Αναλυτικής Χημεία	Εκδόσεις Παπασωτηρίου	1996	