

University of Halabja
Directorate of Quality Assurance



SUBJECT OUTLINE

Academic Year: 2023-2024

1. Information on the Programme

Higher education institution	University of Halabja
College	College of Basic Education
Department	General Science
Field of study	Chemistry
Cycle of study ¹	First Cycle
Specialization/ Study programme	N/A
Form of education	Full time

2. Information on the Discipline

Discipline Name	Analytical Chemistry	Discipline Code	2040106
ECTS	5	Language	English
Lecturer (Theory)		Home page	
Moodle Course link	Course: Analytical Chemistry I UOH LMS	Google Scholar	Renas Wali Mustafa - Google Scholar
E-mail	Renas.mustafa@uoh.edu.iq	Tel	07511919147
Practical/Seminar / laboratory/ project Lecturer	Renas W. Mustafa	Home page	
Moodle Course Link	Announcements UOH LMS	Google Scholar	Renas Wali Mustafa - Google Scholar
E-mail	Renas.mustafa@uoh.edu.iq	Tel	07511919147
Study Year	1	Semester	1st
Assessment type ²	Exam	Discipline status	PF (Preparatory Disciplines in the Field),
Content ³	CD	Mandatory ⁴	MD

3. Prerequisites (if applicable)

Curriculum-related	
Skills-related	

5. Conditions (if applicable)

For the Theoretical	The lectures are presented to the students using white board, colorful markers and Data show Students must bring pencil and paper (or Notebook) Students must present 90% of lectures
For the Practical/Lab. /Project	Using instruments, apparatuses and chemical materials in the lab. Students should bring their own lab coat and gloves. Students must present 90% of lectures

6. Cumulated specific competences

Professional competencies	Extra reading, solving mathematical problems & being able to prepare liquid and solid compounds, recognizing chemical structure of the compounds, balancing chemical equations
Transversal competences	Extra reading, solving mathematical problems being able to prepare liquid and solid compound, recognizing chemical structure of the compounds, balancing chemical equations.

7. Discipline objectives (based on the cumulated specific competences)

General objective	<ul style="list-style-type: none">• Understanding the fundamental concepts of Analytical Chemistry.• 2. Having a thorough theoretical and practical understanding of advanced analytical techniques, methods of measurements and their applications for example for measuring proteins, medicinal, non-medicinal drugs and biomarkers.• Applying knowledge of equilibrium constraints to a range of systems of interest including solubility, acid/base chemistry, complex formation, oxidation/reduction, and precipitation titration.• 4. Being able to assess the quality of your own work in order to be certain your analysis is correct. Also, students will be
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	able to work in a team. Many projects involve collaboration with other fields such as biology, environmental research or medicine.
Specific objectives (Learning Outcomes)	<ul style="list-style-type: none"> ● Use Bloom Taxonomy as follow: ● Remember the fundamentals of analytical chemistry ● Remember performing the practical experiments ● Apply the knowledge of the theoretical lecture in the lab. ● Analyze the data and results of the experiments ● Analyze the reasons in each step ● Calculate the results of the experiments ● Evaluate the results with the references ● Create the report and submit it.

8. Content		
Theoretical- Number of hours	Teaching	Observation
First week	Registration	2 hours
Second week	Introduction to Analytical Chemistry Application of Analytical Chemistry The Language of Analytical chemistry	2 hours
Third week	Precision and Accuracy Basic Tools of Analytical Chemistry Preparing Solutions	2 hours
Fourth week	Volumetric Methods of Analysis (Titrimetric Analysis) Definition of some terms : Titration, Equivalence point and End point, Titration error, Indicators, Primary Standard, Secondary Standard End Points in Volumetric Analysis	2 hours
Fifth week	Method for expressing the concentration of standard	2 hours

	solution Classification of reaction in titrimetric analysis	
Sixth week	Titration Curves	2 hours
Seventh week	Applications of Titrimetry in Pharmaceutical Analysis	2 hours
Eighth week	Precipitation Titrations	2 hours
Ninth week	Precipitation Reactions	2 hours
Tens week	Titration Curves	2 hours
Eleventh week	Methods for finding the end point in Precipitation Titration	2 hours
Twelfth week	Complexation Reactions and Titrations	2 hours
Thirteenth week	Application of Complexation Reactions and Titrations	3 hours

Practical Works– Number of hours	Teaching	Observation
First week	Registration	3 hours
Second week	Introducing chemical apparatuses	3 hours
Third week	Preparing solid and liquid compounds	3 hours
Fourth week	Acid-Base Titration (KHP & NaOH)	3 hours
Fifth week	Acid-Base Titration (Na ₂ CO ₃ & HCl)	3 hours
Sixth week	Redox Titration	3 hours
Seventh week	Precipitation Titration	3 hours
Eighth week	Complexometric titration	3 hours
Ninth week	Gravimetric analysis	3 hours
Tenth week		
Eleventh week		
Twelfth week		
Thirteenth week		

9. Compulsory bibliography

- 1- **FUNDAMENTALS OF ANALYTICAL CHEMISTRY (10TH ED.) BY DOUGLAS A. SKOOG, DONALD M. WEST, F. JAMES HOLLER AND STANLEY R. CROUCH**
- 2- **Principles of Instrumental Analysis (6th edition) written by Douglas A. Skoog, F. James Holler and Stanley R. Crouch in pdf.**

Optional bibliography

- 1- **Analytical chemistry : principles. by. Kennedy, John H. (John Harvey), 1933-. Publication date. 1984. Topics. Chemistry, Analytic, Chimie, Analyse**
- 2- **Larry G. Hargis. Prentice Hall, 1988 - Analytical chemistry - 672 pages. This thorough introduction to analytical chemistry prepares readers to evaluate and compare analytical methods...**
- 3- **Principles of Chemical Sensors Advances in Computer Vision and Machine Intelligence Modern analytical chemistry: Author: Jiri Janata**

10. Corroborating the discipline content with the expectations of the epistemic community representatives, of the professional associations and of the relevant employers in the corresponding field

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11. Assessment

Type of activity	Assessment criteria ²	Assessment type	Final grade Percentage
Theoretical	Written Exam	writing examination	50%
Practical/Laboratory	Theoretical/ practical Exam	Quiz, Homework & Report	%25
Activity during semester	Written Exam	Assignment, Seminars Quiz & Class Activity	%25

Minimum performance standards: Reading English well & Solving chemical problems (chemical equations) and having an introduction to fundamentals of Analytical chemistry

Theoretical Lecturer	Asst. Lec. Renas Wali Mustafa
Practice Lecturer	Asst. Lec. Renas Wali Mustafa Asst. Lec. Amjad Mahmood Qadr Asst. Lec. Musa Mutasam Zorab

Approved by the Curriculum development Committee

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Head of the Department/ Dean	

Notes:

- 1 Cycle of studies - choose one of the three options: Bachelor «1», Master «2», Ph.D. «3»
- 2 (Exam: oral examination, written exam), and (Continous Evaluation(CE), portfolio).
- 3 Discipline status (content) - for the Bachelor level, choose one of the options: FD (fundamental (General) discipline), PF (Preparatory Disciplines in the Field), SD (Specialty Disciplines), CD (Complementary Disciplines), DU (disciplines based on the university's options).
- 4 Discipline status (compulsoriness) - choose one of the options
 - MD (Mandatory discipline),
 - OD (optional discipline),
 - ED (Elective (Facultative) discipline).
- 5 Note: 1 ECTS = 27 hours workload; $ECTS = WL/27$, The first week is registration and introduction to the course.