

Course Description Form

1. Course Name:					
Analytical chemistry (Theoretical+ Practical)					
2. Course Code:					
Phpch23-111					
3. Semester / Year:					
1 st Semester/1 st year					
4. Description Preparation Date:					
24/3/2024					
5. Available Attendance Forms:					
Students' signature on attendance sheet					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 hours Theoretical + 2 hours Practical (75) /4 units					
7. Course administrator's name (mention all, if more than one name)					
Theoretical					
Name: Assist. Prof Dr. Mohammed Najim Email: m.n.abed@uomosul.edu.iq Name: Assist. Lec. Raghad Riyadh Email: raghadalbarhawi@uomosul.edu.iq					
Practical					
Name: Assist. Lec. Raghad Riyadh Email: raghadalbarhawi@uomosul.edu.iq Name: Assis. Lec. Nada Ahmed Email: nadaahmed199238@uomosul.edu.iq Name: Assis. Lec. Wallad Ahamid Email: wallada.h@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			- Preparing students and supporting them with information related to qualitative and quantitative chemical analyzes and studying theories related to that.		
9. Teaching and Learning Strategies					
Strategy		Lecturing Seminars Homework Quiz Mid-term & final exams			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3+2	Review of elementary concept important to analytical chemistry: strong and weak	Introduction to analytical chemistry	Theoretical lectures Practical	Paper-based exams

		electrolytes, importance weight and concentration		(Laboratory safety rules)	
2	3+2	Review of elementary concept important to analytical chemistry: strong and weak electrolytes, importance weight and concentration	Introduction to analytical chemistry	Theoretical lectures Practical(Glass ware laboratory)	Paper-based exams
3	3+2	The evaluation of analytical data: Definition of terms	Introduction to analytical chemistry	Theoretical lectures Practical(Prepare solutions from solids and liquids)	Paper-based exams
4	3+2	The evaluation to gravimetric data, definition of terms	Quantitative analysis	Theoretical lectures. Practical(Titration principles)	Paper-based exams
5	3+2	An introduction to gravimetric analysis: Statistical analysis of data; rejection of data; precipitation methods; gravimetric factor	Quantitative analysis	Theoretical lectures Practical (Titration of HCl with sodium Carbonate)	Paper-based exams
6	3+2	The scope of applications of gravimetric analysis: Inorganic precipitating agents; organic precipitating agents	Quantitative analysis	Theoretical lectures Practical (Titration of HCl with NaOH)	Paper-based exams
7	3+2	An introduction to volumetric methods of analysis: Volumetric calculations; acid-base equilibria and pH calculations	Quantitative analysis	Theoretical lectures Practical (Titration of KMnO ₄ with oxalate acid)	Paper-based exams
8	Mid-term Exam				
9	3+2	Buffer solutions: Theory of neutralization	Quantitative analysis	Theoretical lectures	Paper-based exams

		titrations of simple system		Practical (unknown sample determination)	
10	3+2	Theory of neutralization titrations of complex system; Precipitation titrations	Quantitative analysis	Theoretical lectures Practical (Titration of $Kmno_4$ with ferrous sulfate)	Paper-based exams
11	3+2	Calculation of pH in complex system; Volumetric methods based on complex system	Quantitative analysis	Theoretical lectures Practical (Determination of chloride by Mohr method)	Paper-based exams
12	3+2	Calculation of pH in complex system; Volumetric methods based on complex system	Quantitative analysis	Theoretical lectures Practical (unknown sample determination)	Paper-based exams
13	3+2	Equilibria in oxidation-reduction system; theory of oxidation-reduction titrations	Quantitative analysis	Theoretical lectures Practical (Determination of water hardness)	Paper-based exams
14	3+2	Spectrophotometric analysis: An introduction to optical methods of analysis; Methods based on absorption of radiation	Advanced analytical techniques	Theoretical lectures Practical (unknown sample determination)	Paper-based exams

15

Final Exam**11. Course Evaluation**

- 20 M: theoretical assessment; (paper-based mid-term exam + quiz + attendance + seminars)
 - 20 M: practical assessment (attendance + quiz + practice + unknown sample assessment)
 - 60 M: paper-based theoretical final exam
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- 100 M total

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

1- Fundamentals of Analytical chemistry by koog and West 8th.ed.(2008).

	2-Chemical Analysis in the Laboratory A Basic Guide, by I. Mueller-Harvey and R. M. Baker, ISBN 0-85404-646-1.
Main references (sources)	Modern Pharmaceutical Drug Analysis, by L. Zechmeister) And L. Von. Cholnoky, ISBN (13): 978-81-224-2718-9
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	