MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Qualitative Analytical Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-1111**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Chemistry		**College**	College of Science	
Module Leader	Ekhlas Ahmed Abdulkareem		**e-mail**	ekhlasahmed@uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant teacher		**Module Leader's Qualification**	Msc	
Module Tutor	Name (if available)		**e-mail**	Khloosa123aa@gmail.com	
Peer Reviewer Name	Ekhlas Ahmed Abdulkareem		**e-mail**	ekhlasahmed@uodiyala.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Throughout this course, we will focus on the following learning objectives: 1. Understand the fundamental concepts of chemical equilibrium 2. Parameterize solution behavior and calculate solution concentrations given the appropriate equilibrium constants 3. Apply knowledge of equilibrium constraints to a range of systems of interest including solubility, acid/base chemistry, complex formation, oxidation/reduction, hydrolysis, and phase partitioning. 4. Investigate solution behavior using electrochemical methods, including potentiometry, voltammetry, and ion selective electrodes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the principles of qualitative analysis: * Describe the theoretical basis of classical and modern qualitative analysis techniques. * Explain the chemical reactions involved in group and specific ion analysis. 2. Identify and classify cations and anions in mixtures: * Systematically detect and confirm the presence of inorganic ions using classical group separation schemes. * Apply solubility rules, complexation, precipitation, and redox reactions in qualitative analysis. 3. Demonstrate proficiency in laboratory techniques: * Perform wet chemistry techniques such as precipitation, filtration, centrifugation, and spot tests with proper safety and accuracy. * Handle reagents, glassware, and samples responsibly and in accordance with laboratory safety procedures. 4. Interpret qualitative data and draw conclusions: * Analyze observed chemical reactions (e.g. color change, precipitate formation) and deduce the identity of unknown compounds. * Record and report qualitative results in a clear, logical, and scientifically valid manner.

	5. Apply analytical reasoning to solve problems: * Design a flowchart or procedural plan for the identification of unknown mixtures. * Troubleshoot common issues encountered during qualitative analysis procedures. 6. Evaluate the limitations and reliability of qualitative methods: * Critically assess sources of error and interferences in qualitative tests. * Compare qualitative analysis with quantitative and instrumental techniques in terms of sensitivity and specificity.
Indicative Contents المحتويات الإرشادية	This course offers a comprehensive introduction to Analytical Chemistry, laying a strong foundation in its core concepts and methodologies. It is structured to equip students with essential theoretical knowledge and practical skills necessary for accurate chemical analysis and experimentation. Throughout the program, students will gain in-depth insight into various analytical techniques, mastering the principles that govern them. Emphasis is placed on precise calculations, critical interpretation of data, and systematic evaluation of chemical samples. Engaging laboratory sessions provide hands-on experience, reinforcing theoretical understanding and enhancing technical competence. By the end of the course, students will be capable of executing analytical procedures, addressing complex chemical problems, and contributing effectively to advancements within the field of analytical chemistry.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
Student Workload (SWL)	

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	10% (10)	2,4,6,8 and 10	LO #1, #2, #4, #6 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to analytical chemistry, its types and applications
Week 2	Volumetric analysis and its requirements And the types of solutions and their specifications

Week 3	Methods of expressing the concentration of solutions The most important laws used
Week 4	Solve mathematical examples for calculations concentration of different solutions
Week 5	Chemical balances and constants balance and how to use it in the chemical balance calculations
Week 6	Acids, bases and their types And the presumption and its salts and accounts hydrogen concentration
Week 7	Types of corrections and how Perform correction calculations How to choose the guides
Week 8	**Midterm Exam**
Week 9	Acid and base bleaching And their types
Week 10	Acids and bases corrections power and adjustment accounts and the types of evidence used
Week 11	Acids and bases corrections and its types, and how it is performed accounts
Week 12	Buffering solutions and their specifications How to prepare and make an account acidity function
Week 13	Acidity of solutions and agents affecting them, such as forces ionic and effective coefficient and strong acids and bases
Week 14	multiple acids and how Calculating the acidity and how to make corrections
Week 15	The most important applications of neutralizers in the field of environment, industry and biological analyzes And change it
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in qualitative analysis
Week 2	Lab 2: Analysis of catione
Week 3	Lab 3: The theoretical basis for the analysis of the first group of group cations (group silver)
Week 4	Lab 4: The practical basis for the analysis of the first group of group cations (group silver)
Week 5	Lab 5: First exam - first semester

Week 6	Lab 6:The theoretical basis for the separation of the second group of positive ions (copper-arsenic)
Week 7	Lab 7: The practical basis for separating the second group of positive ions (copper-arsenic)
Week 8	Lab 8: A test on the analysis of anonymous samples of the second group
Week 9	Lab 9: Characteristic descriptive interactions of the third group ions
Week 10	Lab 10: A test on the analysis of the known samples of the third group
Week 11	Lab 11: A test on the analysis of anonymous samples of the third group
Week 12	Lab 12: Characteristic descriptive interactions of the four group ions
Week 13	Lab 13: A test on the analysis of the known samples of the four group
Week 14	Lab 14: A test on the analysis of anonymous samples of the four group
Week 15	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Fundamentals of Analytical Chemistry, Douglas A. Skoog and Donald M. West Eight Edition	Yes
Recommended Texts	Analytical Chemistry, Gary Christian Sixth Edition	No
Websites	www.bytoco.com	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.