

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Analytical chemistry		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	BCE114		
ECTS Credits	5		
SWL (hr./sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Salwa Shamran Jasim	e-mail	salua@kecbu.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	M.Sc.
Module Tutor	Maryam Qais	e-mail	maryam.q@kecbu.uobaghdad.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	7/11/2023	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

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Engineering requires applied science, and chemistry is the center of all science. The more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. 2. The study of Chemistry aims to provide deep understanding of fundamental principles that govern the nature of chemical reactions and facilitate challenges to design and create fine chemicals that benefit society. 3. Biochemical engineers employ chemistry concepts to address problems with the manufacture or usage of chemicals, pharmaceuticals, food, and a variety of other items. 4. Chemistry is an important fundamental topic for engineers, in understanding the properties of materials and solutions and the reaction of materials with the environment (corrosion of metals, durability). 5. Encourage Students through practical experience and academic courses to learn how to design and create environmentally friendly chemical processes involved in water treatment. 6. Master basic mathematical skills like stoichiometry and fundamental chemical concepts.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <ol style="list-style-type: none"> 1. Study The fundamental of analytical chemistry. 2. Acquire knowledge about the quantitative analysis. 3. Study the reaction in aqueous solutions and physical properties of it. 4. Develop practical experience in volumetric & gravimetric analysis. 5. Learn to master the ability to manipulate basic mathematical and critical thinking skills to analyze chemical problems and devise a logical approach to solve the problem, also analyze and interpret graphs as they apply to chemical problems. 6. Be able to determine limiting reactants, theoretical and percentage yields and solution stoichiometry. 7. Solve stoichiometric problems in Solutions: Acid-Base Titrations.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Analytical chemistry.</u></p> <p>Part A: Chemical Composition of Solutions, concentration and properties Volumetric methods of analysis [8 hrs]</p> <p>Part B: Titration curve for complex acid and base system, Precipitation reaction Oxidation – Redaction titration [7 hrs]</p> <p>Part C: Stoichiometry reaction, Gravimetric analysis, Colloidal Precipitates [10 hrs]</p> <p>Part D: Solubility and equilibrium, Spectrophotometric analysis [5 hrs]</p> <p>Part E - Practical Experience [2 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	To provide students with a theoretical back ground in chemical principles that is essential to practice chemical analysis. It enables students to understand the importance of judging the accuracy and precision of experimental data and techniques of quantitative analysis, and also to show that theory frequently serves as a useful guide to the solution of analytical problems.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1h /3	18% (18)	4 , 7 and 12	LO #3, #5, #6 and #7
	Assignments	1h /3	6% (6)	2, 5 and 9	LO #1, #2, #3, #7
	Projects / Lab.	2h /7	14% (14)	Continuous	All
	Report	1h /1	2% (2)	13	LO #4
Summative assessment	Midterm Exam	2hr	10% (10)	7	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 + Scientific measurements
Week 2	Chemical Composition of Solutions , concentration and properties
Week 3	Volumetric methods of analysis
Week 4	Titration curve for complex acid and base system
Week 5	Precipitation reaction
Week 6	Oxidation – Redaction titration
Week 7	Mid exam
Week 8	Stoichiometry of reaction in solutions and Chemical equations
Week 9	Practical matters in reaction stoichiometry
Week 10	Applications of Gravimetric analysis
Week 11	Colloidal Precipitates
Week 12	Mid exam + chromatography
Week 13	General concepts of chemical equilibrium
Week 14	Solubility and complex – ion equilibrium
Week 15	Spectrophotometric analysis
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Analytical chemistry lab and Lab. Safety rule
Week 2	Lab 2: Volumetric measurement glassware and Laboratory Apparatus
Week 3	Lab 3: Preparation and Standardization of acid and base solution
Week 4	Lab 4: Titration of strong acid with strong base
Week 5	Lab 5: Titration of strong acid with weak base
Week 6	Lab 6: Acid-Base titration by double indicator method
Week 7	Lab 7: Determination of w/v % of acetic acid in vinegar
Week 8	Lab8: Analysis by redox titration

Week 9	Lab 9: determination chloride ion concentration by titration
Week 10	Lab 10: Preparation & standardization of $KMnO_4$
Week 11	Lab11: Determination of ferrous ion in ferrous ammonium sulphate
Week 12	Lab 12: Hardness of water
Week 13	Lab 13: Determination of Vitamin C "Iodometric titration"
Week 14	Lab14: thin layer chromatography mid exam
Week 15	exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> ➤ Analytical Chemistry: Principles and Practice by Vic Soffiantini, Walter de Gruyter GmbH, 1st edition (October 25, 2021) ➤ Fundamentals of Analytical Chemistry by Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch 10th ed.; 2021 	No
Recommended Texts	General Chemistry: Principles and Modern Applications by Petrucci, Herring, Madura, Bissonette, 11th edition (2017)	yes
Websites	https://chemistrydocs.com/college-university-exams/comprehensive-chemistry-jee-advanced/	

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.