

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Analytical Chemistry- quantitative analysis		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	UGx11 1	Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Ahmed Subhi Eaheea		e-mail	ahmeaheaheea@uoanbar.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification		pH.D
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2025		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	- The quantitative analysis methods course is determined according to the study plan prepared in the Applied Chemistry Department. - The aim of the study is a comprehensive and clear definition of the basics of quantitative analytical chemistry - Description of measurable compounds and substances in chemical units of concentration and weight - Comprehensive knowledge of bases, acids and their theories
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- That the student know the general concepts of compounds in the analytical chemistry curriculum. - The student should be familiar with the basics and rules classification of analytical chemistry weight and concentration units - The student should know the basic of Aqueous- solution in chemistry , solution of electrolytes and classification of electrolytes - The student should know the of the Acid – base theory and Acid – base conjugated , amphiprotic species - The student should know for Chemical equilibrium and types of equilibrium - The student should understand for Solubility and solubility products constant, dissociation of a weak acid or base and hydrolysis constant
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning - Giving lectures. - Using the method of recitation, discussion and solving questions. - Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods - Daily and monthly exams

	2- Duties 3- In-class exercises
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	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب اسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب اسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 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)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	General Introduction , classification of analytical chemistry weight and concentration units
Week 2	Method of expressing of concentration
Week 3	Aqueous- solution in chemistry , solution of electrolytes and classification of electrolytes
Week 4	Acid – base theory
Week 5	Acid – base conjugated , amphiprotic species
Week 6	Chemical equilibrium, types of equilibrium
Week 7	Equilibrium constant (ionic- products constant of water(K_w))
Week 8	Solubility and solubility products constant, dissociation of a weak acid or base , hydrolysis constant (K_h)
Week 9	Formation constant of complex , multistep equilibrium types, definitions, calculations
Week 10	definitions, calculations and solve problems of equilibrium
Week 11	Effect of common ion, effect of complex formation on solubility
Week 12	Solve problems common ion and complex formation
Week 13	Activity and activity coefficient: definitions, examples and calculations
Week 14	Ionic strength : definitions, examples and calculations
Week 15	Overall review of curriculum
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Introduction quantities analysis (WET reaction)
Week 2	Lab 2: Reaction of group I (Ag ⁺ , Pb ²⁺ , Hg ²⁺)
Week 3	Lab 3: separation of unknown solution
Week 4	Lab 4: reaction of group II
Week 5	Lab 5: reaction of group III
Week 6	Lab 6: separation of unknown solution
Week 7	Lab 7: reaction of group IV, group V and separation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Fundamentals of Analytical Chemistry by Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch (z-lib.org) 2. Quantitative Chemical Analysis (9th Edition) By Daniel C. Harris 3. Analytical Chemistry (6th Edition) by Gary D. Christian	Yes
Recommended Texts	NO	No
Websites	https://www.acs.org/careers/chemical-sciences/areas/analytical-chemistry.html	

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 (فقد 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Analytical Chemistry- volumetric analysis		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	UGx11 1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Ahmed Subhi Eaheea	e-mail	ahmedeaheea@uoanbar.edu.iq	
Module Leader's Acad. Title	lecturer	Module Leader's Qualification		pH.D
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
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	5. The volumetric analysis course is determined according to the study plan prepared in the Applied Chemistry Department. 6. The aim of the study is a comprehensive and clear definition of the basics of Volumetric in analytical chemistry 7. Description of measurable compounds and substances in chemical units pH 8. Comprehensive knowledge of bases, acids titrations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7- That the student know the general concepts of compounds in the volumetric analysis in analytical chemistry curriculum. 8- The student should be familiar with the basics and rules Volumetric methods of analysis and requirements for a primer standard material 9- The student should know the basic of Volumetric calculations for acid base titration and equilibriums in acid base solution 10- The student should know the of the Calculation of pH of acid and base and pH of salts 11- The student should know for Buffer solutions, Calculation of pH of Buffer solutions and buffer capacity 12- The student should understand for Precipitation titration and Complexometric titration
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning 1- Giving lectures. 2- Using the method of recitation, discussion and solving questions. 3- Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods 1- Daily and monthly exams 2- Duties

	3- In-class exercises
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 للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 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)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Volumetric methods of analysis, requirements for a primer standard material , Volumetric calculations for acid base titration and equilibriums in acid base solution
Week 2	Calculation of pH of acid and base
Week 3	Calculation of pH of salts solutions
Week 4	Salts deferential from strong acid and strong base & weak acid and strong base
Week 5	Salts deferential from strong acid and weak base & weak acid and weak base
Week 6	Buffer solutions
Week 7	Calculation of pH of Buffer solutions and buffer capacity
Week 8	Acid base titration , Acid base indicator
Week 9	Theories of indicators
Week 10	Titration curves of acid base (strong –weak)
Week 11	Differential titration (titration mixture of two acid with one base and two base with one acid)
Week 12	Calculation the concentration of pieces of weak acids in known pH • Monoprotic acids • Diprotic acids • Triprotic acids Titration of polyprotic acid
Week 13	Precipitation titration
Week 14	Complexometric titration
Week 15	Overall review of curriculum
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Introduction to volumetric analysis
Week 2	Lab 2: preparation approximately (0.1N) HCl and (0.1N) sodium carbonate
Week 3	Lab 3: standardization of HCl with standard solution of sodium carbonate
Week 4	Lab 4: standardization of NaOH with standard solution of HCl
Week 5	Lab 5: analysis of mixture (NaOH + Na ₂ CO ₃)
Week 6	Lab 6: determination of chloride ion by Mohr method
Week 7	Lab 7: determination of total hardness of water

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	4. Fundamentals of Analytical Chemistry by Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch (z-lib.org) 5. Quantitative Chemical Analysis (9th Edition) By Daniel C. Harris 6. Analytical Chemistry (6th Edition) by Gary D. Christian	Yes
Recommended Texts	NO	No
Websites	https://www.acs.org/careers/chemical-sciences/areas/analytical-chemistry.html	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Inorganic Chemistry		Module Delivery	
Module Type	Course (1 st course)		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	7.00			
ECTS Credits	8			
SWL (hr/sem)	175			
Module Level	UGx1 1	Semester of Delivery		
Administering Department	Univ. of Anbar	College	College of science	
Module Leader	Dr. Sattar Salim Ibrahim		e-mail	Sattar_salim1976@yahoo.com
Module Leader's Acad. Title	Asst. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	
Peer Reviewer Name	Name		e-mail	
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	The objectives of this course is to introduce the student to the basics of fundamental concepts in inorganic Chemistry. At the end of this course the student will be know what mean atomic structure, natural of radiation, electromagnetic radiation, wave natural, energy levels , orbital d,p, determine shielding symbol for atom have more than electron ,some period properties , ionic bond, structure of covalent molecule . molecular orbitals, VB theory, VSEPR theory.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Give an idea to the student about the atomic structure of the elements and an explanation of quantum theory - Knowledge of the nature of radiation and types of spectra Atomic in addition to the study of the linear spectrum radiation emitted by hydrogen gas. - Use four quantum numbers to describe energy of Electron. - Determining the total energy of the main shell in which the electron rotates, as well as determining the shape of the secondary shells within the main shell, determining the orbital direction towards the magnetic field and the direction of the electron's rotation around itself, in addition to the most stable electronic arrangement in the atom. - Introducing students to the periodic table and its contents Of the elements and its subdivisions in addition to his education Term codes
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Deduce the geometric shape of the molecules of any compound from compounds to major components through Introducing the student to the rules of space chemistry for the non-transition element.

	- The possibility of studying electronic structures and the bonding properties of diatomic molecules heterogeneous - Evaluation of the student and the extent to which he benefited from it Lectures and scientific potential
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	14	LO #1 - #14
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Atomic electron structure
Week 2	Origin of quantum theory
Week 3	Electromagnetic radiation – Radiation of black body
Week 4	Photo electric effect
Week 5	Atomic spectra – Line spectrum of H – Bohr theory
Week 6	Summerfield theory – Zeman effect – Electron spin effect
Week 7	The basic principle of wave mechanic
Week 8	First exam
Week 9	Heisenberg's uncertainty principle
Week 10	Schrodinger equation
Week 11	Quantum numbers
Week 12	The term symbols
Week 13	Periodic tables of elements
Week 14	Anomalies in the electronic arrangement and properties of periodic tables
Week 15	Second exam

Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Inorganic chemistry by Dr. Thana Al- Hasani 2- Inorganic chemistry, principles of structure and reactivity, 2nd ed., James E. Huheey, 1983 3- Inorganic chemistry, 3rd ed., Housecroft C.E. and Sharpe A.G., 2008.	Yes
Recommended Texts	No	No
Websites	http://rapidshare.de/files/20322418/Patnaik_P_Handbook_of_inorganic_chemicals McGraw_Hill_2003	

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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Inorganic Chemistry		Module Delivery	
Module Type	Course (2 nd course)		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	7.00			
ECTS Credits	8			
SWL (hr/sem)	175			
Module Level	UGx11 1	Semester of Delivery		
Administering Department	Univ. of Anbar	College	College of science	
Module Leader	Dr. Sattar Salim Ibrahim		e-mail	sattar_salim1976@yahoo.com
Module Leader's Acad. Title	Asst. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	
Peer Reviewer Name	Name		e-mail	
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	The objectives of this course is to introduce the student to the basics of fundamental concepts in inorganic Chemistry. At the end of this course the student will be know what mean atomic structure, natural of radiation, electromagnetic radiation, wave natural, energy levels , orbital d,p, determine shielding symbol for atom have more than electron ,some period properties , ionic bond, structure of covalent molecule . molecular orbitals, VB theory, VSEPR theory.
Module Learning Outcomes	- Introducing the student to molecular hybridization and giving him an idea of geometric shapes - Deduce the geometric shape of the molecules of any compound - Give a simplified idea of some properties the physical elements that can be taken as a basis for arriving at the chemical behavior of these elements depending on their positions in the table. - Introducing students to the hydrogen atom and its compounds and their interactions Hydrogen - isotopes of hydrogen - its compounds And prepare it. - Evaluation of the student and the extent to which he benefited from it Lectures and scientific potential.
Indicative Contents	Indicative content includes the following. - Deduce the geometric shape of the molecules of any compound from compounds to major components through Introducing the student to the rules of space chemistry for the non-transition element. - The possibility of studying electronic structures and the bonding

	properties of diatomic molecules heterogeneous - Evaluation of the student and the extent to which he benefited from it Lectures and scientific potential
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
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Summative assessment	Midterm Exam	2hr	10% (10)	14	LO #1 - #14
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Ionic compounds (properties and conditions of formation of ionic compounds)
Week 2	Crystal lattice energy – Born lande equation
Week 3	Born – Haber cycle – polarization of ionic compound – dissolving of ionic compound – structure of ionic compounds
Week 4	Baraveas lattice – packing of bools – Coordination number
Week 5	Types of crystals – properties of NaCl, CsCl and TiO ₂ crystals.
Week 6	First exam
Week 7	Covalent bond and its properties
Week 8	The theory of covalent bond formation (VBT and MOT)
Week 9	Idea of interaction and force of bond – The symmetry in atomic orbitals
Week 10	Hybridization
Week 11	Hydrogen (properties, isotopes, formation, its compounds , preparation, the bond of hydrogen and the hydrides and its verities
Week 12	The first and second groups
Week 13	The third groups
Week 14	The fourth groups

Week 15	Second exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	2- Inorganic chemistry by Dr. Thana Al- Hasani 2- Inorganic chemistry, principles of structure and reactivity, 2nd ed., James E. Huheey, 1983 3- Inorganic chemistry, 3rd ed., Housecroft C.E. and Sharpe A.G., 2008.	Yes
Recommended Texts	No	No
Websites	http://rapidshare.de/files/20322418/Patnaik_P_Handbook_of_inorganic_chemicals McGraw_Hill_2003	

Grading Scheme مخطط الدرجات				
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	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.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title			Module Delivery
Module Type			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code			
ECTS Credits			
SWL (hr/sem)			
Module Level	2	Semester of Delivery	
Administering Department	Chemistry	College	College of Science
Module Leader	Dr.Rabah Nori Farhan	e-mail	rabahalobaigy@uoanbar.edu.iq
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Computer Science
Module Tutor	Name (if available)	e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents الإرشادية والمحتويات التعلم ونتائج الدراسة المادة أهداف	
Module Objectives الدراسية المادة أهداف	- Understand AI Fundamentals: Introduce students to the basic concepts and history of artificial intelligence. - Explore AI Techniques: Provide a comprehensive overview of various AI techniques, including machine learning, deep learning, and fuzzy systems. - Hands-On Experience: Equip students with practical skills in MATLAB for implementing AI algorithms and techniques. - Analyze Applications: Examine real-world applications of AI in various fields and understand their societal implications. - Encourage Critical Thinking: Foster critical thinking regarding ethical considerations and the future of AI technologies.
Module Learning Outcomes الدراسية للمادة التعلم مخرجات	- Define AI Concepts: Explain fundamental concepts and terminology related to artificial intelligence. - Implement AI Algorithms: Develop and implement basic AI algorithms using MATLAB, including supervised and unsupervised learning methods. - Utilize Neural Networks: Design and train various types of neural networks for different applications. - Evaluate AI Applications: Analyze and evaluate the effectiveness of AI applications in daily life and industry. - Discuss Ethical Issues: Articulate the ethical implications and future trends of AI technologies.
Indicative Contents المحتويات الإرشادية	- Impact on Employment: Examination of job displacement and creation due to AI automation. - Ethical Considerations: Discussion on bias, accountability, and transparency in AI systems. - AI in Governance: Exploration of how AI influences public policy, surveillance, and decision-making processes.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lectures and Discussions: - Use interactive lectures to introduce key concepts, followed by class discussions to encourage critical thinking and engagement. Hands-On Labs: - Implement practical lab sessions in MATLAB where students can apply theoretical knowledge to real-world problems through coding exercises and projects. Group Projects: - Facilitate collaborative learning by assigning group projects that require teamwork to explore specific AI applications or techniques. Online Resources: - Utilize online platforms and resources for additional learning materials, tutorials, and forums for discussion and support outside of class.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الفصل خلال للطالب المنتظم الدراسي الحمل		Structured SWL (h/w) أسبوعيا للطالب المنتظم الدراسي الحمل	5
Unstructured SWL (h/sem) الفصل خلال للطالب المنتظم غير الدراسي الحمل		Unstructured SWL (h/w) أسبوعيا للطالب المنتظم غير الدراسي الحمل	6
Total SWL (h/sem) الفصل خلال للطالب الكلي الدراسي الحمل			

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes			
	Assignments			
	Projects / Lab.			

	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and History of AI. Definition of Artificial Intelligence .Brief history of AI: Turing Test, early developments (1950s-1970s). Key milestones in AI history.
Week 2	AI Techniques and Approaches: Overview of AI techniques: Machine Learning, Deep Learning, Natural Language Processing Traditional vs. modern approaches to AI.
Week 3	Machine Learning Fundamentals. Supervised, unsupervised, and reinforcement learning. Basic algorithms: Genetic Algorithms, Linear regression, decision trees, clustering.
Week 4	Deep Learning and Neural Networks. Introduction to neural networks Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs).
Week 5	AI in Our Daily Life : Everyday applications of AI: Virtual assistants, recommendation systems, smart home devices .AI in transportation: Autonomous vehicles.
Week 6	The Future of AI .Emerging trends in AI: Explainable AI, AI in climate change, human-AI collaboration.
Week 7	Applications of AI: Genetic Algorithms.
Week 8	Applications of AI: Neural Networks.
Week 9	Applications of AI: Feed forward Neural networks.
Week 10	Applications of AI: Deep Learning
Week 11	Applications of AI: Convolutional Neural Networks (CNN).
Week 12	Applications of AI: CNN Case Study.
Week 13	Applications of AI: Fuzzy Systems.
Week 14	AI future Directions.
Week 15	
Week 16	

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Matlab for AI applications.
Week 2	Input/output and arrays in Matlab with introduction to functions and files.
Week 3	Genetic Algorithm implementation in Matlab: basics.
Week 4	Genetic Algorithm implementation in Matlab: developing case study and plotting results.
Week 5	Decision Tree: Implement a basic decision tree classifier on a sample dataset.
Week 6	Implement linear regression and clustering algorithms (e.g., k-means) on a dataset
Week 7	Neural Network :MATLAB task: Create a feedforward neural network for a classification problem using the Neural Network Toolbox
Week 8	Deep Neural Networks: Implement a basic deep learning model using the Deep Learning Toolbox
Week 9	Convolutional Neural Networks (CNNs): MATLAB task: Build a CNN.
Week 10	CNN Case Study.
Week 11	Implement a fuzzy inference system
12	Project Development: Students present their final projects that incorporate various AI techniques and tools
13	
14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Organic Chemistry		Module Delivery
Module Type			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code			
ECTS Credits			
SWL (hr/sem)	30		
Module Level	2	Semester of Delivery	
Administering Department		College	College of Science
Module Leader	Mohammed Adnan Abid	e-mail	moh.adnan@uoanbar.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	1- Omer Saeed Khalifa 2-Marwa Noori Mahmood	e-mail	omar.saeed@uoanbar.edu.iq marwa.noori@uoanbar.edu
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	2024	Version Number	1

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The course aims to introduce students to the principles of organic chemistry. Also, to learn (reagents, conditions) associated with the carbon and hydrogen with most common elements reactions of use to organic chemists, and to understand (concepts) allowing the design of new (more effective) or even unknown reaction mechanism and reaction processes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of Organic Structure and Bonding - Understand the nature of covalent bonding in organic molecules. - Recognize and interpret the structure of organic compounds (e.g., alkanes, alkenes, alkynes, aromatic compounds, etc.). - Understand concepts like hybridization, resonance, and molecular orbitals. 2. Mechanisms of Organic Reactions - Learn and apply the fundamental concepts of organic reaction mechanisms. - Understand and explain reaction pathways (e.g., nucleophilic substitution, electrophilic addition, etc.). - Identify and predict the products of common organic reactions. 3. Functional Groups and Their Chemistry - Recognize the different functional groups in organic molecules (e.g., alcohols, aldehydes, ketones, carboxylic acids, amines, etc.). - Understand how the functional group affects the chemical and physical properties of molecules. - Identify reactions specific to each functional group.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lectures 2. Tutorials 3. Homework 4. Tests and Exams 5. In Class questions and discussion 6. Connection between theory and practical
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5 Times	10	
	Assignments	3 Times	10	
	Projects / Lab.	5 Times	10	
	Report	5 Times	10	
Summative assessment	Midterm Exam	1 Time	10	
	Final Exam	1 Time	50	
Total assessment		100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Material Covered

Week 1	Introduction to Organic Chemistry and Structure
Week 2	Alcohols the reaction mechanisms
Week 3	Ethers, and Epoxides the reaction mechanisms
Week 4	Aldehydes and Ketones
Week 5	Carboxylic Acids and Derivatives
Week 6	Aromatic Compounds (introduction)
Week 7	Aromatic Compounds (principals)
Week 8	Aromatic Compounds (reaction and mechanism)
Week 9	Benzene and its reaction
Week 10	Assessments and Exam
Week 11	Halide Alkyl 1
Week 12	Halide Alkyl 2
Week 13	Revision
Week 14	Preparation for final Exam
Week 15	Final Exam
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	التعريف بأدوات وتجارب المختبر وتهيئة المواد الخاصة
Week 2	تحضير بارا نايترو استينالايد
Week 3	تنقية وإعادة بلورة بارا نايترو استينالايد وتعيين درجة الانصهار
Week 4	تحضير بارا نايترو انيلين + اختبار يومي
Week 5	تحضير كاشف لوكاس
Week 6	اختبار عملي بكاشف لوكاس
Week 7	اختبار يومي + تفاعل شوتن- بومن تحضير البنزاناالايد
Week 8	اختبار شامل بالتجارب السابقة عملي + نظري
Week 9	استخلاص الكافيين من الشاي
Week 10	تحضير الفثاليميد + اختبار يومي
Week 11	تحضير حامض البنزويك
12	اعادة بلورة حامض البنزويك وتعيين درجة الانصهار
13	اختبار شامل بالتجارب السابقة عملي + نظري
14	اختبار شامل

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Organic Chemistry by Jonathan Clayden	Yes and online as well
Recommended Texts	Morrison & Clayden	Yes and online as well
Websites	All websites having organic chemistry topics	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Analytical Chemistry		Module Delivery	
Module Type	Course (1 st course)		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Che-221			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	2	Semester of Delivery	1	
Administering Department	Univ. of Anbar	College	College of science	
Module Leader	Dr. Wahran MonamSaod		e-mail	Sc.wahran.s@uoanbar.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	
Peer Reviewer Name	Name		e-mail	
Scientific Committee Approval Date	20/01/2025	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	Course Objectives □To introduce basic analytical techniques and practical aspects of classical chemical analysis. To solve problems related to precipitation and interpret analytical results. Identifying the precipitation and its methods, learning about type of precipitating factor, method of precipitation . •
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	explain the fundamentals of analytical chemistry and steps of a characteristic analysis. • Expresses the role of analytical chemistry in science.compare qualitative and quantitative analyses. • Expresses the quantitative analysis methods.expresses the qualitative analysis methods. • Evaluate the analytical data in terms of statistics. • Estimates kinds of errors in chemical analysis. • Evaluates the effects of systematic errors on analytical results.compare of the experimental mean with true value and two experimental means. • Determine the detection limits.interpret the statistical tests.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Understand the fundamental principles and thermodynamics of precipitation equilibria.

	- Explain the mechanisms of precipitation, coprecipitation, and the factors affecting precipitate purity and particle size. - Select appropriate precipitation reagents and conditions for specific separation goals (analysis, pre-concentration, interference removal). - Apply strategies to enhance selectivity and minimize errors (coprecipitation, solubility losses). - Describe and perform (theoretically and practically) the key steps in gravimetric analysis based on precipitation. - - Evaluate the advantages, limitations, and applications of precipitation separation methods in modern analytical chemistry Evaluation of the student and the extent to which he benefited from it Lectures and scientific potential
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-the ability to communicate information after monitoring and data collection . 2-linking information with human health reality and influencing other neighborhoods. 3-field visits in non-organic industrial projects 4-participation in workshops, seminars and scientific conferences

	5-follow-up scientific development through contact with international universities
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	125	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	14	LO #1 - #14
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview of the principles of the chemical precipitation
Week 2	Classical deposition methods
Week 3	Precipitation separation methods
Week 4	Chemical precipitation
Week 5	Factors affecting chemical precipitation
Week 6	Chemical sediment pollutants
Week 7	Precipitation from homogeneous solutions
Week 8	First month exam
Week 9	Electrode position
Week 10	Electrostatic deposition devices
Week 11	Deposition under controlled voltage
Week 12	The use of platinum electrodes in the deposition process
Week 13	High performance liquid chromatography
Week 14	Chemical and electrical deposition applications
Week 15	Second month exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Experiment about extraction of oil
Week 2	Experiment about continuous extraction of I2
Week 3	Experiment about simple extraction
Week 4	Experiment about continuous extraction
Week 5	Extraction of tea from aqueous solution
Week 6	Review
Week 7	Quizzed

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Required textbooks (curricular books, if any) Chemical precipitation methods/ Ismail Khalil Al-Hiti 2- Main references (sources) Introduction to chemical deposition methods/ Safaa Razouki Al-Marhib 3- Recommended books and references (scientific journals, reports...) Fundamentals of Analytical Chemistry 4- by Douglas A. Skoog, Donald M. West, et al. 5-	Yes
Recommended Texts	No	No
Websites	1- Electronic References, Websites Researchgate	

- 2- Google scholar
- 3- <https://www.springer.com/journal/13762/>

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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