Academic Program Description Form

University Name: .... Wasit university

Faculty/Institute: .... College of Science

Scientific Department: .... Department of Chemistry

Academic or Professional Program Name: ....Bachelor

Final Certificate Name: .... Bachelor of Science in Chemistry

Academic System: .... Bologna Process

Description Preparation Date: 1-10-2025

File Completion Date: 1-10-2025

Signature:

Head of Department Name:

Dr. Kamal Rashed

Date:1/10/2025

الدكتور
كمال رشيد حسيجان
رئيس قسم الكيمياء

Signature:

Scientific Associate Name:

Dr.Ali Jabar

Date:1/10/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Department:

Date:1/10/2025

Signature:

م.م دنيا فاضل عباس
مسؤول شعبة ضمان الجودة والاداء الجامعي

Approval of the Dean

1. Program Vision

Leadership and excellence in education and scientific research in the field of chemistry and its applications in serving society and the environment, effective participation with community institutions, and striving to advance the department to ensure its compliance with international standards in the field of chemistry.

2. Program Mission

Preparing scientific competencies in the field of chemistry to contribute to scientific, health, industrial, educational and economic development in the governorate, solving environmental problems through theoretical and applied research and providing distinguished educational, research and training services.

3. Program Objectives

- Preparing graduates specialized in chemistry at a distinguished level in academic terms to supply the labor market in the governorate with its needs of specialists in various fields.
- Participate in finding solutions to the problems of the local environment and national industries through research and development.
- To be an expert in providing scientific consultations to concerned parties, and organizing scientific seminars and advanced research seminars in various fields of chemistry.
- Keeping pace with modern developments in the field of scientific research, by holding periodic discussion sessions and workshops to keep pace with new developments in scientific research.
- Supporting twinning between the chemistry department at the university and chemistry departments in local and international universities to keep pace with progress and scientific development and to participate in scientific research because of its importance in raising the international rankings of our university.
- Enhancing the skills of faculty members, supporting staff, and workers, by holding periodic discussion sessions, workshops,

training courses, and participating in local and international scientific seminars and conferences.

- Preparing qualified human resources to contribute to educational progress in the governorate in particular and in Iraq in general.
- Meeting the department's needs for faculty members by appointing distinguished and top performers as teaching assistants and sending them on scholarship to obtain master's and doctoral degrees from distinguished universities in accordance with the college's future study plan.
- Equipping laboratories, conducting various scientific research, and linking the department to the community and its surrounding environment.
- Providing chemistry courses to serve other specializations in the departments of the College of Science and the Colleges of Medicine, Engineering, Dentistry, Agriculture, Pharmacy, and Education.

Program Structure	Number of Courses	Credit hours
Institution Requirements	8	18
College Requirements	–	–
Department Requirements	30	162
Summer Training	1	2
Other	–	–

* This can include notes whether the course is basic or optional.

Program Structure

Academic year: First(Bologna) First course	Theoretical	Practical	Units
Inorganic chemistry	3	---	6
Analytical Chemistry	2	3	8
Arabic language	2	---	3
Human rights	2	---	4
Labortary Sefty	2		4
Cell	2	3	5
TOTAL UNITS		30	

Academic year: First(Bologna) Second course	Theoretical	Practical	Units
Inorganic chemistry	3	---	6
Analytical Chemistry	2	3	8
General physics	2	2	4
Mathematics	2	---	5
English	2	---	3
Computers	---	2	4
TOTAL UNITS		30 ECT	

Academic year: Secod(Bologna) First course	Theoretical	Practical	Units
Inorganic chemistry	2	2	6
Analytical Chemistry	2	2	6
Physical Chemistry	2	2	5
Organic chemistry	2	2	5
Mathematics	2	---	3
Computers			3
Arabic language	2	---	2
TOTAL UNITS		30 ECT	

Academic year: Secod(Bologna) Second course	Theoretical	Practical	Units
Inorganic chemistry	2	2	6
Analytical Chemistry	2	2	5
Physical Chemistry	2	2	5
Organic chemistry	2	2	5

Nano Chemistry	2	---	5
Baath party crimes	2		2
English language	2	---	2
TOTAL UNITS		30 ECT	

Academic year: Third(Bologna) First course	**Theoretical**	**Practical**	**Units**
Organic chemistry 3	3	3	6
Physical Chemistry	3	3	6
Inorganic Chemistry 5	3	3	6
Biochemistry	3	3	6
Principles of Industrial chemistry	2	---	4
Heterocyclic CHEMISTRY	2	---	2
TOTAL UNITS		30 ECT	

Academic year: Third (Bologna) Second course	**Theoretical**	**Practical**	**Units**
Organic chemistry	3	3	6
Physical Chemistry	3	3	6
Consistency Chemistry	2	3	6
Biochemistry	2	3	6
Industrial chemistry	2	---	4
Organic Reactions Mechanism	2	---	2
TOTAL UNITS		30 ECT	

4. Faculty

Faculty Members

Academic Rank	**Specialization**		**Special Requirements/Skills (if applicable)**	**Number of the teaching staff**	
	General	**Special**		**Staff**	**Lecturer**

Prof Dr. Rhameem Azeez	chemical enginerring	corrosion electroplating			√	
Prof Dr Subhi Abdul sattar	Chemical engineering	Polymers			√	
Asst. Prof. Dr. Athraa Kitammy	Chemistry	organic chemistry			√	
Asst. Prof. Sadeek Hameed	Chemistry	Pollution			√	
Asst. Prof.Dr. Fatmaa Abas	Chemistry	Analytical chemistry			√	
Asst. Pof. Jawad Abius	Chemistry	organic chemistry			√	
Asst. Prof. Dr. Haider Dawood	Chemistry	Inorganic chemistry			√	
Asst. Prof. Dr. Kamal Rasheed	Chemistry	organic chemistry			√	
Asst. Prof. Dr. Amar Farman	Chemistry	organic chemistry			√	
Asst. Prof. Dr Atheeer Abeed Al saheeb	Chemistry	Inorganic chemistry			√	
Lect. Dr. Zaid Mohamed	Chemistry	Polymer			√	
Lect. Dr. Saraah Bedry	Chemistry	Physical chemistry			√	
Lect. Dr. Assel Farhan	Chemistry	organic chemistry			√	
Lect.Dr. Hussain Sarie	Chemistry	Bio chemistry				√
Lect. Balkes Raheem	Chemistry	Pollution			√	

Lect. Surrah Hameed	Chemistry	Inorganic chemistry			√	
Asst. Lect. Issam Hussian	Chemistry	physical chemistry			√	
Asst. Lect. Suaad Ali	Mathematic	Mathematic			√	
Asst. Lect. Dewia Athab	Educational Science	Law			√	
Asst. Lect. Mohamed Mahdey	Chemistry	Inorganic chemistry			√	
Asst. Lect. Israa Khamess	Chemistry	Analytical chemistry			√	
Asst, Lect. Zena Rassak	Chemistry	organic chemistry			√	
Asst. Lect. Farked Faraaj	Chemistry	Analytical chemistry			√	
Asst. Lect. Mannar Sattar	Chemistry	Bio chemistry			√	
Asst. Lect. Alla Neshmy	Chemistry	organic chemistry			√	
Asst. Lect. Mohameed Rasheed	Chemistry	Bio chemistry			√	
Asst. Lect. Farrah Kathem	Chemistry	Analytical chemistry			√	
Asst. Lect. Israa Sattar	Chemistry	organic chemistry			√	
Asst. Lect. Olla Zuhair	Chemistry	organic chemistry			√	
Asst. Lect. Zaineb Sabrry	Chemistry	Bio chemistry			√	

Asst. Lect. Safaa Jumaa	Chemistry	physical chemistry			√	
Asst. Lect. Thaqeef Murtatha	Chemistry	physical chemistry			√	
Asst. Lect. Saiaf Ahmeed	Chemistry	Bio chemistry			√	
Asst. Lect. Saiaf Issa	physics	physics			√	
Asst. Lect. Ali Saleem	physics	general physics			√	
Asst. Lect. Lamess Mohamed	Chemistry	Bio chemistry			√	
Asst. Lect. Wasan Raad	Economics	Economics			√	
Asst. Lect. Zahra Ali Taher	Chemistry	Bio chemistry			√	
Asst. Lect. Diana Khaled	Chemistry	Organic			√	
Asst. Lect. Ali Mohammed Salman	Chemistry	Analytical chemistry			√	

Description of the Academic Program- Phase I

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Qualitative Analytical Chem.**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-111**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level		UGI	**Semester of Delivery**		One
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Subhi A. Al-bayaty		**e-mail**	Salbayaty @uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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 Aims أهداف المادة الدراسية	1. Get comprehensive and clear definition of the basics of quantitative in analytical chemistry. 2. Describe the measurable compounds and substances in chemical unit of concentration and weight. 3. Comprehensive knowledge of acids, bases and their theories.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic concept of compounds in analytical chemistry. 2. To be familiar with the basics and rules classification of analytical chemistry weight and concentration units. 3. To know the basics of aqueous solution and solution of electrolytes and classification of electrolytes. 4. Understand the acid-base theory and acid-base conjugated and amphiprotic species. 5. Ability to know chemical equilibrium and types of equilibriums. 6. Understand solubility and solubility products constant, dissociation of a weak acid or base and hydrolysis constant.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-3	General introduction, Classification of analytical chemistry, Weight and concentration units, Methods of expressing of concentrations
Week 4-7	Aqueous solution chemistry, Solution of electrolytes and classification of electrolytes, acid-base theories, Acids, Bases and Conjugated Acids/Bases, Amphiprotic species.
Week 8-12	Chemical equilibrium, Types of equilibrium, equilibrium constants(Ionic-product constant of water, Solubility and solubility product constant, Dissociation of a weak acid or base, Hydrolysis constant (KH), Formation constant of complex, Multistep equilibrium types, definitions, calculations, Effect of common ion, Effect of complex formation on solubility, and problems.
Week 13-14	Activity and activity coefficient : definitions, examples, calculations, Ionic strength : definitions, examples, calculations.
Week 15	**Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Reaction of groups 1(Ag^{+}, Pb^{+2}, Hg_2^{+2})
Week 2	The principle of separation of group I
Week 3	Separation of unknown solution
Week 4	Reaction of group II
Week 5	The principle of separation of group II
Week 6	Separation of unknown solution
Week 7	Reaction of group III
Week 8	The principle of separation of group III
Week 9	Separation of unknown solution
Week 10	Reaction of group IV, group V and separation
Week 11	The principle of separation, Separation of unknown solution
Week 12	Dry reaction (Flame test) for some metal ions

Week 13	Separation of anions solutions
Week 14	Tests for certain combination of anions
Week 15	Tests for particular substances : Hydrazine and Hydroxylamine, Sulphamate, Hydrogen peroxide
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Doulas A. Skoog, Donald M. West, F. James, Stanley R. Crouch, Fundamental of Analytical Chemistry, 9Edt.,2014, Brooks/Cole, Cengage, Learning, New York, 1090 p 2. Daniel C. Harris, Quantitative Chemical Analysis, 7 Edt. 2007, published by W. H. Freeman and Company, New York. 3. Gary D. Christian, Purnendue K. Dasgupta and Kevin A. Schug. Analytical Chemistry, 6Edt.,2004, John Wiley and Sons, Inc.	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

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	**Inorganic Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHE1102**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Hayder Dawood Jasim Arkawazi		**e-mail**	harkawazi@uowasit.edu.iq	
Module Leader's Acad. Title		Associated Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Name (if available)		**e-mail**	harakwazai@uowasit.edu.iq	
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 Aims أهداف المادة الدراسية	1. Get a comprehensive and clear definition of the basics of Inorganic chemistry. 2. Cover the valance bond theory and hybridization of covalent molecules. 3. Cover molecular orbital theory and interactions of orbitals. 4. Studying the periodic properties of the elements including IE, EA, ionic radii, metallic properties. 5. Studying groups one, two, thirteen, fourteen, and fifteen.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concept of element, molecules, and compounds in inorganic chemistry. 2. To be familiar with the basics and rules of periodic table classification for the elements and their properties and reaction. 3. Ability to know chemical equilibrium and types of equilibriums. 4. Hybridization for simple molecules.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-3	General introduction, the origin of quantum theory, black body radiation, atomic spectrum, quantum numbers, term symbol.
Week 4-7	Periodic properties of the elements, ionization energy, shielding, electronegativity, electron affinity, ionic and atomic radii, and metallic properties.
Week 8-12	Ionic compounds: their physical and chemical properties. The formation of ionic compounds, crystal lattice energy, the structure of ionic compounds.
Week 13-14	Covalent compounds: their physical and chemical properties. The formation of covalent compounds, the structure of covalent compounds. valance bond theory, and molecular orbital theory.
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Inorganic Chemistry, 4th edition by Catherine Housecroft, and Alan G. Sharpe. 2. Inorganic Chemistry, 5th edition by G. Missler, and D. Tarr. 3. Inorganic Chemistry, 5th edition by Shriver and Atkins.	Yes
Recommended Texts	Non	No
Websites	Non	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Cytology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-111**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	**Che-111**		**College**	Sciences	
Module Leader	Zainab Dhiyaa Alkhateeb		**e-mail**	zalkhateeb @uowasit.edu.iq	
Module Leader's Acad. Title	Doctor/ 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	04/07/2023		**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 Aims أهداف المادة الدراسية	1- The students will get to know the cell in general and what the word cell means in the biological concept . 2- Study the basic compounds of living matter in cells . 3- Study the difference between eukaryotic and prokaryotic cells. 4- Identify the organelles of the cell . 5- Study the functions of cellular organelles in detail .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To obtain sufficient information about the concept of the cell . 2- What does the cell mean in building the bodies of living organisms? 3- What are the terms eukaryotic and prokaryotic cells ? 4- The cellular organelles and their role in cellular construction . 5- The functions of cellular organelles and their role in sustaining the cell life . 6- The relationship between organelles functions to give cells certain functions according to the nature of the tissue that contains them or to live .
Indicative Contents المحتويات الإرشادية	The educational content includes the following . 1- An overview of the cell and its concepts . 2- How the cell discovered, who the first was to define the cell, and who were the scientists who continued to develop the concept of the cell. 3- The discovery and development of the microscope and its role in the study of cytology. 4- Types of cells, their shape , and the relationship to the functions they perform. 5- Morphological changes in cells, cillia and flagella. 6- Cell life cycle and cell divisions. 7- Of transferring hereditary traits between cells.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage student's 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to cytology , cell theory and types of cells.
Week 2	Chemical composition of cell .
Week 3	The cell membrane structure and chemical composition of membranes.
Week 4	The cell membrane functions and membrane transport .
Week 5	Junctions between cells and appendages on cell membrane .
Week 6	Cellular organelles , cytoplasm and its functions and mitochondria and its structure and function .
Week 7	Endoplasmic reticulum, types of endoplasmic reticulum , Ribosomes and Golgi body and its functions.

Week 8	First exam
Week 9	Vesicles and lysosomes, functions of vacuole, centrioles, plastids , chloroplast
Week 10	The differences between plant and animals , nucleus an its structure .
Week 11	Chromosome parts , chromosome types , cell cycle and cell cycle phases.
Week 12	Types of cell division , mitosis and phases of mitosis
Week 13	Cytokinesis , meiosis and meiosis I phases.
Week 14	Meiosis II phases .
Week 15	The necessity for cell death in multicellular organisms , apoptosis , necrosis and its changes that occurs ,the dramatic morphological and physiological changes that occurs during apoptosis and classes of cells that undergo programmed cell death.
Week 16	Second exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Microscope and types of microscope .
Week 2	The cell and functions of cells.
Week 3	Shapes and sizes of cells, contents of cells , Detection of plant cell wall components .
Week 4	Cell membrane , functions and structure of cell membrane .
Week 5	Methods of transporting substances across a membrane .
Week 6	Osmotic behavior of red blood cells and an experiment to study the effect of solutions of different concentrations on red blood cells .
Week 7	First exam
Week 8	Cellular organelles (mitochondria) ,the structure and function of mitochondria
Week 9	Plastids , the structure ,shape and function of chloroplast and Preparing microscopic slides of plastids and distinguishing between their types .
Week 10	Golgi apparatus and his function , vacuoles , types , function and structure of vacuoles and watch the vacuoles under the microscope .
Week 11	Non-living components substance (crystals) , starch grains, pigments and proteins .
Week 12	Techniques and methods for studying the cell , Mitosis division and its phases
Week 13	Cytokinesis division ,amitosis division , meiosis division and its phases.
Week 14	Programmed cell death , the important of apoptosis , Stages of apoptosis process and necrosis .

Week 15	Second exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas D. Pollard, MD, William C. Earnshaw ,Jennifer Lippincott – Schwartz and Graham Johnson, Cell Biology. 2023. 4th edition. Saunders.	Yes
Recommended Texts	Thomas D. Pollard, MD, William C. Earnshaw , Jennifer Lippincott-Schwartz and Graham Johnson, Cell Biology. 2017. 3rd edition. Saunders.	Yes
Websites	https://www.allencell.org/genomics.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

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	**Laboratory safety**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-114**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Blqees Raheem		**e-mail**	bodhafa@uowasit.edu.iq	
Module Leader's Acad. Title	Professor/ 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	Che-114	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The student understands the basic rules of occupational safty. 2. Identify the correct steps and take them in the event of a problem in the chemical laboratory. 3. Identify the appropriate engineering design of the laboratory and the desigh related and the design related to the exit and entry areas. 4. Identify amethod and plan to protect all workers in the chemical laboratory. 5. The student must understand all the signs, instructions, and warnings in the laboratory to reduce the risks of conducting experiments in it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Awareness and understanding of all rights and correct procedures to ensure safety in the laboratory. 2. Identify and evaluate risks in the laboratory. 3. The importance of occupational safty as it is the responsibility of all laboratory. 4. Familiarity with all the distinctive and new rules the work to fully control the workflow in the laboratory with out
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning ● Lectures ● Using recitation, discussion and problem solving ● Assignments -Evaluation ● Daily and monthly exam ● 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General safety precautions in chemical laboratory.
Week 2	precautions to be followed for safety of Chemical in circulation.

Week 3	Signs that must be respected in laboratories.
Week 4	Various harmful effects of Chemicals.
Week 5	Risks and injuries in chemical laboratory.
Week 6	Safty precautions for experiments that require heating.
Week 7	Safty precautions when handing glassware.
Week 8	Safty precautions when dealing with compressed gas cylinders.
Week 9	Ways to reduce risks.
Week 10	Safty precautions after completing work in the laborat.ory .
	Safty precautions when stoing and presorving chemicals. Storage of explosive chemicals. Types of fires and means of extinguishing them. Types of extinguishers. First aid. First aid methods in case of poisoning.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Occupationa safty and health /Charles D. Reese. 2.Occupational safty and health for /David LGeetsch 3 Fundamentals of occupational safty and health/Mark A. Friend/James p. Kohm	Yes
Recommended Texts	No	No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**اللغة العربية**			**Module Delivery**	
Module Type	**نظري**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	Uom1203				
ECTS Credits	**3**				
SWL (hr/sem)					
Module Level	نظري		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	كلية العلوم /جامعة واسط	
Module Leader	Name م.د. نضال حسيب فلفل		**e-mail**	nahaseeb@uowasit.edu.iq	
Module Leader's Acad. Title	Professor		**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	20/11/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None اساسيات اللغة العربية	**Semester**	
Co-requisites module	None كيفية معرفة اعراب مفردات اللغة العربية	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
	1- أن يفهم الطالب الأسس الحقيقية لمادة اللغة العربية 2- التعرف على اهم مصادر المتبعة في دراسة اللغة العربية 3- التعرف على اهم المواضيع التي تكون بتماس مع واقع الحياة العصرية 4- -تشجيع الطلاب على كتابة تقارير او بحوث لتقوية اسلوبهم ولغتهم 5- - توعية الطلاب على بعض الأخطاء اللغوية الشائعة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-- المعرفة والفهم 2- -التعرف على اساسيات اللغة العربية وضبطها أ2-التعرف على تطور المفردات المقارنة بين اشكال اللغة العربية ومفرداتها بين الماضي والحاضر 4 -التعرف على مناهج البحث العلمي .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis

	with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1-توفير فرص التعلم المستمر للطلبة وتحفيزهم عليها د2- التعلم الذاتي المنظم د3- التواصل الاجتماعي د4- الإدارة الذاتية

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**مادة الاملاء كتابة التاء**
Week 2	**التنوين**
Week 3	**الحروف الشمسية والقمرية**
Week 4	**همزة الوصل**
Week 5	**قواعد اللغة العربية.. اقسام الكلام الاسم والفعل والحرف**
Week 6	**العدد وتثنيته وجمع**
Week 7	**الممنوع من الصرف**
Week 8	**المبتدا والخبر**

Week 9	**الصفة بكل انواعها**
Week 10	**النداء في اللغة العربية**
Week 11	**المعارف والنكرات**
Week 12	**مادة الميزان الصرفي كيف نزن الفعل الثلاثي وغير الثلاثي**
Week 13	**مادة الادب ..نشاة الادب وتطوره في العصور الادبية**
Week 14	**الشاعر احمد شوقي مثال على الشعر الوجداني**
Week 15	**الشاعر الجواهري**
Week 16	**بدر شاكر السياب مثال عن الشعر الحر**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	الكتاب المنهجي المقرر لتدريس اللغة العربية في الصفوف غير الاختصاص تاليف مجموعة من اساتذة كلية التربية جامعة واسط	Yes
Recommended Texts		No
Websites	محاضرات خاصة بالموضوع /الانترنت	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**حقوق الأنسان والديمقراطية**			**Module Delivery**	
Module Type	**نظري**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	Uom1203				
ECTS Credits	**3**				
SWL (hr/sem)					
Module Level		نظري	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	كلية العلوم /جامعة واسط	
Module Leader	Name م . وجناء رزاق عبد		**e-mail**	wagna@uowasit.edu.iq	
Module Leader's Acad. Title		Professor	**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		20/06/2023	**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	
	1- أن يفهم الطالب الأسس الحقيقية لحقوق الأنسان 2- التعرف على اهم مصادر حقوق الأنسان وحرياته 3- التعرف على اهم الضمانات الدولية والوطنية لحقوق الأنسان 4- التعرف على الإعلان العالمي لحقوق الأنسان 5- أن يفهم الطالب كيفية الدفاع عن حقوقه - التعرف على اهم خصائص ومميزات تعريف حقوق الأنسان 5- -التعرف على حقوق المرأة في الدستور العراقي النافذ 2005 6- - توعية الطلاب لمتطلبات نشر حقوق الأنسان في المجتمع العراقي
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-- المعرفة والفهم 2- -التعرف على مفهوم واهم مباديء الديمقراطية أ2-التعرف على تطور الديمقراطية 3- المقارنة بين اشكال الديمقراطية بين الماضي والحاضر 4 -التعرف على مناهج البحث العلمي .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs]

	RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1-توفير فرص التعلم المستمر للطلبة وتحفيزهم عليها د2- التعلم الذاتي المنظم د3- التواصل الاجتماعي د4- الإدارة الذاتية

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**مفهوم حقوق الأنسان، تعريف،**
Week 2	**خصائص حقوق الأنسان**
Week 3	**الضمانات الداخلية /مبدا سيادة القانون**
Week 4	**حقوق الأنسان قديما**
Week 5	**الحقوق والحريات في الإسلام**
Week 6	**الحقوق والحريات في الدستور العراقي 2005**
Week 7	**حقوق الأنسان حديثا**
Week 8	**الحقوق والحريات السياسية**
Week 9	**حق الانتخاب والترشيح**

Week 10	**حقوق المرأة والطفل**
Week 11	**حقوق المرأة في الإسلام**
Week 12	**مفهوم الديمقراطية**
Week 13	**الديمقراطية حديثا**
Week 14	**اليات وركائز الديمقراطية**
Week 15	**أنواع وأشكال الديمقراطية**
Week 16	**الأنظمة الديمقراطية**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	الكتاب المنهجي المقرر/ ا.د ماهر صالح علاوي الجبوري	Yes
Recommended Texts		No
Websites	محاضرات خاصة بالموضوع /الانترنت	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Volumetric Analytical Chem.**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-121**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Subhi A. Al-bayaty		**e-mail**	Salbayaty @uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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	Che-111	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Get comprehensive and clear definition of the basics of volumetric in analytical chemistry. 2. Describe titration principles and requirement. 3. Classifying the volumetric titration into their types. 4. Describe the theoretical basis of all kinds of titrations methods. 5. Applying correct calculations methods to calculate the concentration of the substance to be estimated in all types of titration in chemical unit pH 6. Defining of all types of titration indicators and describing their mechanism of action.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to describe the theoretical aspects of all type volumetric analytical titration. 2. Understand the basic concepts and rules of volumetric methods of analysis in analytical chemistry. 3. Drives titration curves for all kind neutralization titration. 4. Understanding methods of calculation of basic of volumetric calculation of acid-base titration and equilibriums in acid base solution. 5. Ability to know the calculation of pH of acid and pOH and pH of salt solutions. 6. Describe buffer solutions and calculating pH of buffer solution and buffer capacity. 7. Ability to distinguish among (Acid-Base, Redox, Precipitation and Complexometric titration. 8. Solves the problem of Precipitation, Redox and Complexometric titration. 9. Define electrochemical cells and solving problems involving electrode potentials.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	-Volumetric methods of analysis -Requirement for a primary standard -Volumetric calculation for acid-base titration Equilibrium in acid-base titration
Week 2-4	-Calculating the pH of weak acids and base solutions - Calculating the pH of salts solution -Salt differential from strong acid and strong base - Salt differential from weak acid and strong base - Salt differential from strong acid and weak base - Salt differential from weak acid and weak base
Week 8-9	- Buffer solutions - Calculate the pH of buffer solutions - Buffer capacity - Acid-base titration - Acid-base Indicators (Methyl Orange, Phenolphthalein) **-Selection of suitable indicator or choice of indicator:** -Theories of color indicators Ostwald theory (ionic theory), chromophore theory, Ionic-chromophore theory - Titrating of strong acid with the strong base - Titrating a weak acid with a strong base - Titrating a strong acid with a weak base - Titrating a weak acid with a weak base
Week 10-11	-Differential titration (Titration mixtures of two acids, Titration one base or mixture of two base with strong acid) -Calculation of the concentration of pieces of weak acids in known pH • Monoprotic acids • Diprotic acids • Triprotic acid - Titration of polyprotic acid
Week 12	Precipitation titrations • Conditions for precipitation titration

	• Classification of precipitation titration • Titration curves • Determination of End point for precipitation titration : Indicators • Mohr method (formation of a colored precipitate) • Volhard method (formation of a colored complex) • Fajan method (adsorption indicators)
Week 13	Complexometric titration • Types of ligands • Complex formation constant • EDTA equilibrium • Titration curves of EDTA • Titration curves of EDTA when the pH value is not limited • Effect of pH on EDTA content • Titration curves of EDTA when the pH value is limited • EDTA titration techniques 1. Direct titration 2. Back titration 3. Displacement titration 4. Indirect titration Indicators in Complexometric titration
Week 14	Oxidation/Reduction reactions • Electrochemical cell (EC) • Electrochemical Classification • Nernst Equation • Potential relation with various equilibrium constants • Oxidation-Reduction titration • Indicators in oxidation-reduction titrations
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Preparation of approximately (0.1N) HCl and(0.1N) Sodium carbonate
Week 3	Standardization of HCl with standard solution of Sodium carbonate
Week 4	Analysis of Sodium carbonate
Week 5	Introduction
Week 6	Preparation of approximately (0.1N) HCl and(0.1N) Sodium carbonate
Week 7	Standardization of HCl with standard solution of Sodium carbonate
Week 8	Analysis of Sodium carbonate
Week 9	Analysis of mixture ($NaOH+Na_2CO_3$)
Week 10	Analysis of mixture ($NaHCO_3+Na_2CO_3$)
Week 11	Determination of chloride ion by Mohr method
Week 12	Preparation(0.1N) $Na_2C_2O_4$ and Standardization of $KMnO_4$ with $Na_2C_2O_4$, then determination the reduction titration
Week 13	Determination of total hardness of water
Week 14	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Doulas A. Skoog, Donald M. West, F. James, Stanley R. Crouch, Fundamental of Analytical Chemistry, 9Edt.,2014, Brooks/Cole, Cengage, Learning, New York, 1090 p 2- Daniel C. Harris, Quantitative Chemical Analysis, 7 Edt. 2007, published by W. H. Freeman and Company, New York. 3- Gary D. Christian, Purnendue K. Dasgupta and Kevin A. Schug. Analytical Chemistry, 6Edt.,2004, John Wiley and Sons, Inc.	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

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	**Inorganic Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHE1102**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Hayder Dawood Jasim Arkawazi		**e-mail**	harkawazi@uowasit.edu.iq	
Module Leader's Acad. Title		Associated Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Name (if available)		**e-mail**	harakwazai@uowasit.edu.iq	
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 Aims أهداف المادة الدراسية	1. Get a comprehensive and clear definition of the basics of Inorganic chemistry. 2. Cover the valance bond theory and hybridization of covalent molecules. 3. Cover molecular orbital theory and interactions of orbitals. 4. Studying the periodic properties of the elements including IE, EA, ionic radii, metallic properties. 5. Studying groups one, two, thirteen, fourteen, and fifteen.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concept of element, molecules, and compounds in inorganic chemistry. 2. To be familiar with the basics and rules of periodic table classification for the elements and their properties and reaction. 3. Ability to know chemical equilibrium and types of equilibriums. 4. Hybridization for simple molecules.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-3	General introduction, the origin of quantum theory, black body radiation, atomic spectrum, quantum numbers, term symbol.
Week 4-7	Periodic properties of the elements, ionization energy, shielding, electronegativity, electron affinity, ionic and atomic radii, and metallic properties.
Week 8-12	Ionic compounds: their physical and chemical properties. The formation of ionic compounds, crystal lattice energy, the structure of ionic compounds.
Week 13-14	Covalent compounds: their physical and chemical properties. The formation of covalent compounds, the structure of covalent compounds. valance bond theory, and molecular orbital theory.
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Inorganic Chemistry, 4th edition by Catherine Housecroft, and Alan G. Sharpe. 2. Inorganic Chemistry, 5th edition by G. Missler, and D. Tarr. 3. Inorganic Chemistry, 5th edition by Shriver and Atkins.	Yes
Recommended Texts	Non	No
Websites	Non	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Physics Science**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-124**				
ECTS Credits	**4**				
SWL (hr/sem)	**115**				
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Hussein Taqi John Ali		**e-mail**	hjohn@uowasit.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	It is desired to identify the physical laws and its rule on Chemical phenomena and life. Solved problems will cover the applications of physics in Chemical systems. Analysis and communication: real Chemical systems are extremely complex and rarely well-defined. Making reasonable assumptions and identifying models is the key to progress.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Objectives: The course provides a general introduction to the physics of Chemicalsystems. Contents: The course presents the basic concepts of chemistry, solutions, the concept of reaction, atomic structure, descriptive models of fluid flow, electrophoresis and osmosis. Course Outcomes: At the end of the course the student will be able to deal with different components and problems such as charge, field, volts, currents, etc. Students can read diagrams and connect circuits and get results. He can analyze the results and get the properties of the components …., Something like that is how to write the outcome of the course
Indicative Contents المحتويات الإرشادية	A-Knowledge: Lectures will provide a basic understanding of the key concepts of Chemical by applying physical principles, methods and techniques. B-Cognitive Skills It is desired to identify the physical laws and its rule on Chemical phenomena. Solved problems will cover the applications of physics in Chemical systems C- Interpersonal skills and responsibilities Students will be encouraged to attempt the problems independently and then collaborate and solve together. D- Analysis and communication: Real Chemical systems are extremely complex and rarely well-defined. Making reasonable assumptions and identifying models is the key to progress.

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 and by considering the types of simple experiments involving some interesting sampling activities for 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamental of Physical Science
Week 2	Atomic and Their Structure
Week 3	Vectors
Week 4	Force and Laws of Motion
Week 5	Velocity & Acceleration
Week 6	Energy, work, and power
Week 7	Universal Gravitation
Week 8	Uniform circular motion
Week 9	Oscillations

Week 10	Electric Charge
Week 11	Electric Field and Electric Potential
Week 12	OHM'S LAW
Week 13	Capacitors
Week 14	Introduction to electrostatics
Week 15	Magnetism and magnetic materials

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Simple pendulum
Week 2	Lab 2: Calculate the focal length of a convex lens
Week 3	Lab 3: Calculate the focal length of a concave lens
Week 4	Lab 4: Calculating the focal length of mirrors
Week 5	Lab 5: Calculating the viscosity coefficient of liquids
Week 6	Lab 6: Helical spring
Week 7	Lab 7: Ohm's law
Week 8	Lab 8: Kirchhoff's law
Week 9	Lab 9: Calculate the internal resistance of the voltmeter
Week 10	Lab 10: Compound pendulum
Week 11	Lab 11: Calculate the coefficient of friction
Week 12	Lab 12: Calculate the density of the liquid
Week 13	Lab 13: Calculate the surface tension coefficient
Week 14	Lab 14: RC Circuits
Week 15	Lab 15: RLC Circuits
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	- Classical Mechanics: A Basic Introduction, Michael Cohen (2011). - Basics of electrical circuits , by Ahmed Al-Nahhal (2001). - Physics of sound and wave motion, by Hadi Al-Shammari (2003).	
Recommended Texts	- - Physical Chemistry Chemical Physics, by Steven O. et (2000).	
Websites		

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
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	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	**التفاضل والتكامل**			**Module Delivery**	
Module Type	**نظري**			☒ **Theory** ☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level	نظري		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	كلية العلوم /جامعة واسط	
Module Leader	Name م.م. سعاد علي محمد		**e-mail**	smuhammed@uowasit.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor	م.م. سعاد علي محمد		**e-mail**	smuhammed@uowasit.edu.iq	
Peer Reviewer Name	professor		**e-mail**	E-mail	
Scientific Committee Approval Date	1/03/2024		**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	
1. Module Aims **2.** أهداف المادة الدراسية	1- بينان مفهوم التفاضل والتكامل وانواعه 2- تعريف المشتقة والتكامل 3- قواعد التفاضل والتكامل 4- بيان العلاقة بين التفاضل والتكامل
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- المعرفة والفهم 2- التعرف على مفاهيم التفاضل والتكامل 3- استنتاج طرق لحل مسائل التكامل 4- التعرف على مناهج البحث العلمي .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u>

	Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1-توفير فرص التعلم المستمر للطلبة وتحفيزهم عليها د2- التعلم الذاتي المنظم د3- التواصل الاجتماعي د4- الإدارة الذاتية

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	مفهوم المشتقة والتعرف على رموزها وحل امثلة باستخدام تعريف المشتقة واعطاء واجبات بيتية
Week 2	تطبيقات هندسية وفيزيائية للمشتقة وحل بعض الامثلة
Week 3	قواعد المشتقة واستخدامها في الحل
Week 4	مشتقات الدوال المثلثية
Week 5	الاشتقاق الضمني
Week 6	مفهوم التكامل وانواعه
Week 7	حل امثلة عن التكامل
Week 8	التكامل الغير محدد
Week 9	حل امثلة عن التكامل الغير محدد
Week 10	بعض النظريات عن التكامل الغير محدد
Week 11	التكامل المحدد
Week 12	بعض العلاقات المهمة بين الدوال المثلثية العكسية
Week 13	تكاملات نتيجتها دوال مثلثية عكسية
Week 14	حساب بعض التكاملات
Week 15	بعض الطرق لحل التكاملات

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**محاضرات من أعداد مدرس المادة**	Yes
Recommended Texts		No
Websites	**محاضرات خاصة بالموضوع /الأنترنت**	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Computer Science**			**Module Delivery**	
Module Type	Basic			☒**Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		UGI	**Semester of Delivery**		One
Administering Department		WAR	**College**	College of Engineering	
Module Leader	Nhad K. Frhan Al-Abboodi		**e-mail**	nkadhum@uowasit.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PH.D
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	None
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Giving the student a general idea of computer material at a study environment, library, and at home. 2. Understanding the basic rules for dealing with and managing computers (computer basics, computer components, computer and software licenses, operating systems, ...), With the aim of preparing the student to enter the programs he needs in the department. 3. Giving the student knowledge about the office applications as basic principles for students in the College of Engineering. 4. Providing a sufficient introduction on the programming concepts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowing computer peripherals, their connections and Windows system. 2. Distinguish between the important tabs in the Word program. 3. The ability to write an entire paragraph with formatting. 4. Understand the basics of power point program. 5. Understand the excel sheet program. 6. Understanding the concepts of programming

Indicative Contents المحتويات الإرشادية	Part A (9 hr) Introduction to computer principles and main operating system. Part B(9 hr) MS Word software, introduction , main menus, commands and additional tasks Part C (6 hr) MS Power Point program, introduction , main menus, commands and additional tasks. Part D (9 hr) MS Excel program, introduction , main menus, commands and additional tasks Part E (8 hr) Introduction to the programing

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Using computers and display screens to explain lectures to students to increase students' mental comprehension. 2. Practical application in the computer lab of what was explained in the theoretical lecture. 3. Using direct questions in the classroom as brainstorming skills. 4. Encouraging students to solve class and homework assignments and to perform specialized reports.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	4, 6, 10	All
	Assignments	10	10% (10)	Continuous	All
	Projects / Lab.	15	15% (15)	Continuous	All
	Report	/	/	/	/
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computer Fundamentals, computer components, computer Safety, and software Licenses
Week 2	Main Operating systems
Week 3	Additional tasks in operating system
Week 4	Introduction to Microsoft word, exploration of main menus
Week 5	Additional tasks in Ms Word Cont.
Week 6	Additional tasks in Ms Word Cont.
Week 7	Mid-term exam
Week 8	Introduction to Microsoft Power Point
Week 9	Insert Objects and Add Animations in Microsoft Power Point
Week 10	Introduction to Microsoft Excel
Week 11	Additional Tasks in Microsoft Excel.
Week 12	Additional Tasks in Microsoft Excel. Cont.
Week 13	Introduction to programming
Week 14	Additional Tasks in programing
Week 15	**Review and a preparatory week before the Final Exam**
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Computer Fundamentals.
Week 2	Introduction to Microsoft word, Insert Objects to Microsoft word
Week 3	Insert Objects to Microsoft word
Week 4	Additional Tasks in Microsoft word
Week 5	Introduction to Microsoft Excel
Week 6	Insert Objects to Microsoft Excel

Week 7	Additional Tasks in Microsoft Excel
Week 8	Introduction to Microsoft Power Point
Week 9	Additional Tasks in Microsoft Power Point
Week 10	Additional Tasks in Microsoft Power Point
Week 11	Introduction to Microsoft Excel
Week 12	Additional Tasks in Microsoft Excel.
Week 13	Introduction Tasks in programing
Week 14	Additional Tasks in programing

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اساسات الحاسوب وتطبيقاته المكتبية الجزء الاول (للمؤلف أ.د. غسان حميد عبد المجيد) اساسات الحاسوب وتطبيقاته المكتبية الجزء الثاني (للمؤلف أ.د. غسان حميد عبد المجيد)	نعم
Recommended Texts	Microsoft Word 2019 Step by Step (Joan Lambert)	كلا
Websites		

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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**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.

جدول الساعات المجدولة و غير المجدولة لمادة

Computer Skills

نوع النشاط	الساعات المجدولة SSWL	الساعات غير المجدولة USSWL	عدد الأسابيع	ساعة لكل أسبوع	العبء الكلي للنشاط
محاضرات	محاضرات في القاعات الدراسية		15	1	15
المختبر	دوام المختبر		15	2	30
مناقشات	المناقشات		0	0	0
مشروع عملي	مشروع عملي		0	0	0
		التهيئة للمشروع	0	0	0
انجاز الواجب البيتي		تحضير المشاريع البيتية	3	1	3
العروض التقديمية	القاء العرض التقديمي		0	0	0
		التهيئة للعرض التقديمي	0	0	0
الامتحانات اليومية		التهيئة للامتحانات اليومية	3	2	6
امتحان نصف الفصل	الامتحان		0	0	0
		التهيئة للامتحان	1	6	6
امتحان نهاية الفصل	الامتحان		1	3	3
		التهيئة للامتحان	1	12	12
			العبء الكلي للمادة خلال الفصل:		75
			عدد الوحدات:		3

*لا توجد ساعات مجدولة لهذه النشاطات كون تم استيفاؤها ضمن الصفوف الدراسية.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Academic English 1			**Module Delivery**	
Module Type	Basic			■ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	WU02				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Mechanical	**College**	Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PhD
Module Tutor	Ali Faraj Hammadi		**e-mail**	alifaraj@uowasit.edu.iq	
Peer Reviewer Name		• Hala A.Naman AL Taee • Ismail Sharhan Hburi • Ahmed Adel Naji	**e-mail**	• alaataeh@uowasit.edu.iq • isharhan@uowasit.edu.iq • ahmedadil@uowasit.edu.iq	
Scientific Committee Approval Date		9-11-2023	**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	
Module Aims أهداف المادة الدراسية	This module provides all the language and skills students need to improve their English, with grammar, vocabulary, and skills work in every unit. The aim is represented by the module's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Demonstrate understanding of academic texts and summarize them orally and in writing. 2- Demonstrate an ability to write with a fair degree of accuracy in a variety of genres. 3- cope effectively with everyday situations everywhere in English 4- Demonstrate learner independence and be aware of their own linguistic strengths and weaknesses. 5- Participate in discussions/seminars on a variety of subject related, academic and general topics.
Indicative Contents المحتويات الإرشادية	12.5 hrs : Reading Skills 12.5 hrs : Writing Skills 12.5 hrs : Listening Skills 12.5 hrs : Speaking Skills

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Reading a range of pre-intermediate level articles on selected general topics. Writing a topic (informal emails, e.g.,) to classmates to discuss group work. Writing and submitting an assignment to a lecturer, Writing slides for presentations. Listening to authentic material at the beginner level to develop listening skills and comprehension. For Speaking, students may self-select and discuss topics with classmates on a group project. Typical topics that could be used at this level in the teaching of vocabulary include The World Around Us (Countries, Nationality, Language, Physical world, Weather, etc.). It may be appropriate for students to select grammar points for discussion in class, or for the lecturer to select them as they arise in students' writing. Grammar points that typically arise at this level include present simple and past simple; present continuous; question forms and auxiliary verbs; comparison; word order; prepositions; basic phrasal verbs.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20%(20)	6, 10	LO 1, LO2
	Home work (ONLINE+ ONSITE)	2	10%(10)	5,10	LO2
	Report	.	-	-	-
	Seminar	1	10%(10)	12	All
Summative assessment	**Midterm Exam**	2	10%	6,12	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit.1 Hello!
Week 2	Unit.2 Your world
Week 3	Unit.3 All about you
Week 4	Unit.4 Family and friends
Week 5	Unit.5 The way I live
Week 6	Unit.6 Every day

Week 7	Unit.7 My favorites
Week 8	Unit.8 Where I live
Week 9	Unit.9 Times past
Week 10	Unit.10 We had a great time!
Week 11	Unit.11 I can do that!
Week 12	Unit.12 Please and thank you
Week 13	Unit.13 Here and now
Week 14	Unit.14 It's time to go!
Week 15	**Presentation (seminars)**
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New headway beginner student book	Yes
Recommended Texts	Murphy R English Grammar in Use	No
Websites	https://apoyanblog.files.wordpress.com/2017/08/new_headway_beginner_-_student	

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
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	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.				

تفاصيل الساعات المجدولة في الإسبوع الواحد

CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)
2	0	0	0	0	0

CL تعني ساعة تدريس في الصف

Lec تعني ساعة تدريس اونلاين

Lab نعني ساعة مختبر

Pr تعني ساعة تطبيقية (عادة تخص المجموعات الطبية)

Tut تعني ساعة مساعدة توتوريال

Sem تعني ساعة سيمنار و ممكن ان يستضاف احد فيها لالقاء موضوع او يقدم فيها الطلبة

نموذج للنشاطات غير المجدولة

الانشطة المذكورة هي امثلة

يجب ان لا تتجاوز ساعاتك 17 ساعة بالفصل

نوع النشاط	عدد الاسابيع	عدد الساعات لكل اسبوع
تحضير الدروس اليومية	**12**	**1**
التهيئة للعرض التقديمي (إن كان هناك عرض تقديمي)	٠	٠
التهيئة للامتحانات اليومية	**2**	**1**
التهيئة للامتحان النهائي	**1**	**3**
التهيئة للمشروع (إن كان هناك مشروع مطلوب من قبل استاذ المادة)	**-**	**-**
المجموع الكلي للساعات غير المجدولة		**17**

Code	Course/Module Title	ECTS	Semester
	Academic English 1	2	Two
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	2	33	17
Description			
The purpose of this module is to develop students' linguistic ability by focusing on the key skills of reading, writing, speaking and listening, to encourage students to become independent learners and to introduce them to strategies and skills to enable them to cope with the demands, both academic and cultural, of undergraduate study in an English-speaking environment.			

Description of the Academic Program- Phase II

Semester one

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Gravity analytical chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-221**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Raheem Aziz Hussein Al-Uqaily		**e-mail**	razeez@uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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		01/08/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-211	**Semester**	TWO
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Obtain a comprehensive and clear definition of separation methods in analytical chemistry 2- Learn how to perform the different separation methods
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Students learned about the separation method using solvent extraction 2- Students learned about the ion exchange separation method 3- Students learned the method of chromatography using the paper and thin layer method 4- Students learned the method of chromatography using the gas method 5- Students learned the method of chromatography using the highly efficient liquid method
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chemical analysis methods
Week 2	Deposition methods
Week 3	Characteristics of the sediments used
Week 4	Chemical composition of sediment
Week 5	Gravimental parameters calculations
Week 6	Gravimental parameters examples and exercise
Week 7	**Firs month exam**
Week 8	Sediment solubility
Week 9	Dissolution yield
Week 10	Solutions of examples and exercise
Week 11	Factors affecting solubility
Week 12	Calculation on Factors affecting solubility
Week 13	Solutions of examples and exercise
Week 14	Mechanics of sediment formation and types of impurities
Week 15	Second month exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Determination of water of crystallization hydrated copper sulphate CuSo4-XH2o using Volatilization method
Week 2	Determination of sulphate as barium sulphate BaSo4
Week 3	Report
Week 4	Determination of Ca+2 as calcium oxalate
Week 5	Determination of iron as ferric oxide Fe2O3
Week 6	Exam
Week 7	Determination of lead as lead chromate
Week 8	Determination of nickel as dimethylglyoxime complex
Week 9	Report
Week 10	Exam
Week 11	Gravimetric determination of sulphate in tap water
Week 12	Report
Week 13	Determination of chloride as silver chloride AgCl
Week 14	Determination of aluminium as 8 hydroxy quinolate
Week 15	Determination of copper as copper (1) thiocyanate

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	كتاب الكيمياء التحليلية النظري–المقرر	Yes
Recommended Texts	كتاب الاسس العامة للتحليل الكيميائي والوزني المؤلف/ د.صفاء رزوقي المرعب	yes
Websites	1. *Skoog, Douglas A.; West, Donald M.; Holler, F. James; Crouch, Stanley R. (2014). Fundamentals of Analytical Chemistry. Belmont: Brooks/Cole, Cengage Learning. p. 1. ISBN 978-0-495-55832-3* 2- **Og, Douglas A.; Holler, F. James; Crouch, Stanley R. (2007). *Principles of Instrumental Analysis*. Belmont, CA: Brooks/Cole, Thomson.Skop. 1. ISBN 978-0-495-01201-6.**	

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.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Inorgainc Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level	Year Two		**Semester of Delivery**	One	
Administering Department	Chemistry		**College**	College of science	
Module Leader	Hayder Dawood Jasim		**e-mail**	harkawazi@uowasit.edu.iq	
Module Leader's Acad. Title	Associated Professor Dr.		**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	01/08/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	All	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. Allowing students to learn the nature of inorganic chemistry 2. Training students to study the chemical and physical properties of the studied topics 3. Preparation and detection of inorganic compounds. 4. Basic and advanced principles of inorganic chemistry.
Module Learning Outcomes	1. Explains the basic concepts and principles of inorganic chemistry 2. Classifies inorganic molecules according to their functional groups and properties. 3. Write the systematic nomenclature for any compound with a functional group. 4. Distinguish between inorganic reactions such as addition, substitution, or elimination. 5. Apply the necessary chemical principles when performing practical inorganic chemistry experiments. 6. Follows chemical safety and security instructions during practical experiments. 7. Uses chemicals in a way that ensures his safety and the safety of others inside the laboratory 8. Participate in suggestions and effective solutions in practical experiments. 5. 9. Evaluates the importance of organic chemistry in his environment and daily life.
Indicative Contents	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • In-class exercises

Learning and Teaching Strategies	
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 and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem)	64	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	61	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	125		

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

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to the inorganic chemistry compounds, and the periodic table.
Week 2	Molecular orbital theory for inorganic and organic compounds.
Week 3	Molecular orbital theory for inorganic and organic compounds.
Week 4	Acid base chemistry
Week 5	Acid base chemistry
Week 6	Acid base chemistry
Week 7	**Exam One**
Week 8	Oxidation reduction
Week 9	Oxidation reduction
Week 10	Oxidation reduction
Week 11	Group theory and symmetry
Week 12	Group theory and symmetry
Week 13	Group theory and symmetry
Week 14	Nitrogen chemistry
Week 15	**Exam Two**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Chemical safety and security instructions during experiments
Week 2	Simple, double, and complex salts.
Week 3	Acid and bases
Week 4	Purification of sodium chlorid salt
Week 5	Purification of sodium chlorid salt
Week 6	Preparation of sodium hydroxide
Week 7	Dectection of sodium hydroxide ions
Week 8	Preparation of potassium sulphate aluminum sulphte.n hydrate alum
Week 9	The detection of potassium sulphate aluminum sulphte.n hydrate alum
Week 10	The crystalline water molecules in potassium sulphate aluminum sulphte.n hydrate alum
Week 11	**Exam one**
Week 12	Preparation of ammonium sulphate iron(II) sulphte.n hydrate alum
Week 13	Detection of of ammonium sulphate iron(II) sulphte.n hydrate alum
Week 14	Soild water in ammonium sulphate iron(II) sulphte.n hydrate alum
Week 15	**Exam two**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**Inorganic chemistry by Missler and Tarr** **Inorganic chemistry by catherin Housecraft**	No

Grading Scheme			
Group	**Grade**	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	(45-49)	More work required but credit awarded
	F – Fail	(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 1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-214**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	One	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Athra G. Sager		**e-mail**	asaker@uowasit.edu.iq	
Module Leader's Acad. Title	Assist. Professor 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	01/08/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-114	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. allowing students to learn the nature of carbon atoms in organic compounds 2. Training students to study the naming, structure, and chemical properties of the studied topics 3. teaching in the preparation and many reactions of compounds. 4. Giving students the basic principles of advanced organic chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explains the basic concepts and principles of organic chemistry 2. Classifies organic molecules according to their functional groups and properties. 3. Write the systematic nomenclature for any compound with a functional group. 4. Distinguish between organic reactions such as addition, substitution, or elimination. 5. Apply the necessary chemical principles when performing practical organic chemistry experiments. 6. Follows chemical safety and security instructions during practical experiments. 7. Uses chemicals in a way that ensures his safety and the safety of others inside the laboratory 8. Participate in suggestions and effective solutions in practical experiments. 9. Evaluates the importance of organic chemistry in his environment and daily life.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Structure and bonding
Week 2	Hybridization of organic compounds and solvents
Week 3	Polar moment, Carbocation. Carbanion. Free radical
Week 4	Alkanes, naming, physical properties
Week 5	Stereochemistry/ alkane
Week 6	, Alkanes reactions and detection. Alkanes preparation and free radicals mechanism
Week 7	**cyclo alkanes, their preparation and reactions**
Week 8	**First month exam**

Week 9	**Alkenes, their naming and isomers**
Week 10	**Alkenes preparation - addition mechanism**
Week 11	**Elimination reactions and elimination mechanism detection of alkenes**
Week 12	**Dienes**
Week 13	**Alkynes, their naming, preparation**
Week 14	**Alkynes, their reactions and detection methods**
Week 15	Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Chemical safety and security instructions during practical experiments exam
Week 2	Identifying chemicals and how to schedule and handle them
Week 3	Crystallization
Week 4	melting point
Week 5	Boiling point
Week 6	Sublimation experiment
Week 7	Measuring boiling point of a mixture of materials

Week 8	exam
Week 9	Conventional distillation of a mixture - fractional distillation
Week 10	Extraction of caffeine from tea
Week 11	Chromatography (chromatography papers)
Week 12	Methane preparation
Week 13	Cyclohexane preparation
Week 14	Bayer's reagent
Week 15	Second month exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	**كتاب الكيمياء العضوية مورسن النظري–المقرر**	Yes
Recommended Texts	**كتاب الكيمياء العضوية د.عذراء كطامي** **كناب الكيمياء العضوية د. فهد علي** **المؤلف/ د.صفاء رزوقي المرعب**	yes
Websites	**https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A8-%D8%A7%D9%84%D9%83%D9%8A%D9%85%D9%8A%D8%A7%D8%A1-%D8%A7%D9%84%D8%B9%D8%B6%D9%88%D9%8A%D9%87-%D9%85%D9%88%D8%B1%D9%8A%D8%B3%D9%88%D9%86-%D9%88-%D8%A8%D9%88%D9%8A%D8%AF-pdf.**	

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
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	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	**Thermodynamics Chemistry 1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-213**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		One
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Raheem Aziz Hussein Al-Uqaily		**e-mail**	razeez@uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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		01/08/2024	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-Improving the level of chemistry science in all fields 2- Transferring what is new about these sciences to serve society 3-Raising the economic level of the country 4- Providing relevant institutions and departments with technical and scientific graduates the new ones 5- Joint cooperation with state institutions and the private sector for work Scientific research to solve related problems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-The department aims to graduate scientific cadres capable of working in health and educational institutions, factories, chemical laboratories, and central research laboratories. 2- Building the research and analytical capacity of students 3- Developing their deductive side and teaching them to deal with laboratory equipment 4-Developing the student's ability to understand the specialty and deal with it flexibly 5-Create a state of familiarity with the vocabulary of the specialty 6-Advance responsibility in serving society and the country through this specialty
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • In-class exercises

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Explanation and clarification through lectures 2-How to display scientific materials using data shows and plasma screens 3-Self-learning through homework assignments 4-Continuous daily and weekly surprise tests 5-Guiding students to some sources to benefit from and expand students' understanding of scientific material 6- -Laboratories 7- Graduation projects 8- Scientific visits 9- Seminars and scientific seminars 10- Summer training

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Combined the first and second's law of thermodynamics
Week 2	Combined the first and second's law of thermodynamics
Week 3	Solutions of equations
Week 4	Thermochemistry 2
Week 5	Thermochemistry 2
Week 6	Solutions of equations
Week 7	Phase rule
Week 8	Phase rule
Week 9	exam

Week 10	Free energy
Week 11	Free energy
Week 12	Solutions of equations
Week 13	Chemical equilibrium
Week 14	Chemical equilibrium
Week 15	Chemical equilibrium

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction on thermodynamics
Week 2	Adsorption of acetic acid on the surface of activated carbon
Week 3	Determine the solubility of sodium persulfate in water and determine the transition point
Week 4	Solubility as a function of temperature
Week 5	Phase diagram of a solid/solid binary
Week 6	Report
Week 7	Exam
Week 8	Find the mutual solubility between phenol and water
Week 9	Study of the ethyl acetate/water-ethanol system
Week 10	Measuring the molecular weight of a solid using the freezing point method
Week 11	Measuring the molecular weight of a solid using the boiling point elevation method
Week 12	Report
Week 13	Exam
Week 14	Review for experiments
Week 15	Review for experiments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Theoretical Physical Chemistry Textbook - Course	Yes
Recommended Texts	Book of basics of physical chemistry	yes
Websites	General and physical chemistry By the author Abdel-Aleem Abu Al-Majd Physical chemistry; By Farrington Daniels Experiments in thermodynamic physical chemistry By the author Ahmed bin Abdul Aziz Al Owais Chemistry elements Physics by Harry Clary Jones Electrophysical chemistry By the author Ali Muhammad Al-Rikabi	

Grading Scheme مخطط الدرجات				
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-216**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	UGII		**Semester of Delivery**	one	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Raheem Aziz Hussein Al-Uqaily		**e-mail**	razeez@uowasit.edu.iq	
Module Leader's Acad. Title	Professor/ 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	01/08/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Obtain a comprehensive and clear definition of differential equations , its types and matrixes
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Teaching students differential equations of all types, linear, homogeneous, and inhomogeneous, first and second degrees, as well as Bernoulli's equations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	First order differential equations
Week 2	Differential equations with separable variables
Week 3	Homogenous equations
Week 4	Exact equations
Week 5	Linear equation s
Week 6	Bernoulli's equation s
Week 7	**Firs month exam**
Week 8	Second order differential equations
Week 9	Second order differential equations
Week 10	Homogenous Second order differential equations
Week 11	Homogenous Second order differential equations
Week 12	Non-Homogenous Second order differential equations
Week 13	Non-Homogenous Second order differential equations
Week 14	Solve examples
Week 15	Second month exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**نظرية المعادلات التفاضلية, د. احمد زين العابدين محمد, جامعة الموصل,1992** **Differental equations, Paul Dawkins, 2007**	yes
Recommended Texts		yes
Websites	**Notes on differential equations, Jery Lebl, 2017**	

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.

Description of the Academic Program- Phase II

Semester Two

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Separation methods**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-211**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		One
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Raheem Aziz Hussein Al-Uqaily		**e-mail**	razeez@uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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		01/08/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-121	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Obtain a comprehensive and clear definition of separation methods in analytical chemistry 2- Learn how to perform the different separation methods
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Students learned about the separation method using solvent extraction 2- Students learned about the ion exchange separation method 3- Students learned the method of chromatography using the paper and thin layer method 4- Students learned the method of chromatography using the gas method 5- Students learned the method of chromatography using the highly efficient liquid method
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Separation methods by solvents extraction
Week 2	Separation methods by solvents extraction
Week 3	Separation methods by solvents extraction
Week 4	Solutions of questions
Week 5	Ionic exchange
Week 6	Ionic exchange
Week 7	Ionic exchange
Week 8	**Solutions of questions**
Week 9	exam
Week 10	Chromatography methods LC
Week 11	Chromatography methods LC
Week 12	Chromatography methods GC
Week 13	Chromatography methods GC
Week 14	Chromatography methods HPLC
Week 15	Chromatography methods HPLC

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Determination of the percentage of iodine extraction by an organic solvent
Week 2	Repot
Week 3	Exam
Week 4	Determination of the substituting capacity of anionic and cathodic exchanges
Week 5	Repot
Week 6	Exam
Week 7	Choosing the right solvent to separate commercial link by paper chromatography
Week 8	Repot
Week 9	Exam
Week 10	Separation of commercial link paper chromatography
Week 11	Repot
Week 12	Exam
Week 13	Separation of orthonitrophenol from paranitrophenol using thin layer chromatography
Week 14	Repot
Week 15	Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	كتاب الكيمياء التحليلية النظري–المقرر	Yes
Recommended Texts	كتاب الاسس العامة للتحليل الكيميائي والوزني المؤلف/ د.صفاء رزوقي المرعب	yes
Websites	1. *Skoog, Douglas A.; West, Donald M.; Holler, F. James; Crouch, Stanley R. (2014). Fundamentals of Analytical Chemistry. Belmont: Brooks/Cole, Cengage Learning. p. 1. ISBN 978-0-495-55832-3* 2- **Og, Douglas A.; Holler, F. James; Crouch, Stanley R. (2007). *Principles of Instrumental Analysis*. Belmont, CA: Brooks/Cole, Thomson.Skop. 1. ISBN 978-0-495-01201-6.**	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic chemistry 2**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-224**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	One	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Amaar farman Adod		**e-mail**	ferman@uowasit.edu.iq	
Module Leader's Acad. Title	Assist. Professor 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	01/08/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-214	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. allowing students to learn the nature of carbon atoms in organic compounds 2. Training students to study the naming, structure, and chemical properties of the studied topics 3. teaching in the preparation and many reactions of compounds. 4. Giving students the basic principles of advanced organic chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explains the basic concepts and principles of organic chemistry 2. Classifies organic molecules according to their functional groups and properties. 3. Write the systematic nomenclature for any compound with a functional group. 4. Distinguish between organic reactions such as addition, substitution, or elimination. 5. Apply the necessary chemical principles when performing practical organic chemistry experiments. 6. Follows chemical safety and security instructions during practical experiments. 7. Uses chemicals in a way that ensures his safety and the safety of others inside the laboratory 8. Participate in suggestions and effective solutions in practical experiments. 9. Evaluates the importance of organic chemistry in his environment and daily life.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Aromatic compounds
Week 2	Naming of aromatic compounds
Week 3	Preparation and detection of aromatic compounds
Week 4	Substitution reactions of unsubstituted rings
Week 5	Substitution reactions of substituted rings
Week 6	Mechanism of substitution reactions

Week 7	First month exam
Week 8	Alkyl halides
Week 9	SN1, SN2 reactions
Week 10	Preparation of alkyl halides
Week 11	Alcohols, their naming and physical properties
Week 12	Preparation of alcohols
Week 13	Reactions of oxygen and carbon alcohols
Week 14	Detection of alcohols
Week 15	Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Chemical safety and security instructions during practical experiments
Week 2	Preparation of nitrobenzene
Week 3	Experiment to detect aromatic compounds
Week 4	Sodium reagent
Week 5	Lucas's reagent (alcohols)
Week 6	Brady's reagent (aldehydes and ketones)
Week 7	Exam1
Week 8	Tollen's reagent (aldehydes and ketones)
Week 9	Iodoform reagent
Week 10	(Phenols and alcohols)
Week 11	preparation of Aspirin

Week 12	the physical properties of aspirin
Week 13	Preparation of unigol from cloves
Week 14	Preparation of alkyl halide from alcohol
Week 15	Exam2

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**كتاب الكيمياء العضوية مورسن النظري–المقرر**	Yes
Recommended Texts	**كتاب الكيمياء العضوية د.عذراء كطامي** **كناب الكيمياء العضوية د. فهد علي** **المؤلف/ د.صفاء رزوقي المرعب**	yes
Websites	**https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A8-%D8%A7%D9%84%D9%83%D9%8A%D9%85%D9%8A%D8%A7%D8%A1-%D8%A7%D9%84%D8%B9%D8%B6%D9%88%D9%8A%D9%87-%D9%85%D9%88%D8%B1%D9%8A%D8%B3%D9%88%D9%86-%D9%88-%D8%A8%D9%88%D9%8A%D8%AF-pdf.**	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Thermodynamics Chemistry 2**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-223**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Raheem Aziz Hussein Al-Uqaily		**e-mail**	razeez@uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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		01/08/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-213	**Semester**	two
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-Improving the level of chemistry science in all fields 2- Transferring what is new about these sciences to serve society 3-Raising the economic level of the country 4- Providing relevant institutions and departments with technical and scientific graduates the new ones 5- Joint cooperation with state institutions and the private sector for work Scientific research to solve related problems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-The department aims to graduate scientific cadres capable of working in health and educational institutions, factories, chemical laboratories, and central research laboratories. 2- Building the research and analytical capacity of students 3- Developing their deductive side and teaching them to deal with laboratory equipment 4-Developing the student's ability to understand the specialty and deal with it flexibly 5-Create a state of familiarity with the vocabulary of the specialty 6-Advance responsibility in serving society and the country through this specialty
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • In-class exercises

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Explanation and clarification through lectures 2-How to display scientific materials using data shows and plasma screens 3-Self-learning through homework assignments 4-Continuous daily and weekly surprise tests 5-Guiding students to some sources to benefit from and expand students' understanding of scientific material 6- -Laboratories 7- Graduation projects 8- Scientific visits 9- Seminars and scientific seminars 10- Summer training

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Parameters of Gases and their units
Week 2	Gas Laws
Week 3	Dalton's Law & Real gas
Week 4	Thermodynamic Concepts
Week 5	Thermodynamic Concepts
Week 6	The first law of thermodynamics
Week 7	**First month exam**
Week 8	The first law of thermodynamics
Week 9	1st law of thermodynamic
Week 10	1st law of thermodynamic
Week 11	heat capacities
Week 12	heat capacities
Week 13	Adiabatic changes
Week 14	Adiabatic changes
Week 15	**Second month exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction on thermodynamics
Week 2	Finding the molecular weight of a volatile liquid/Dumas method
Week 3	The relationship of gas volume to temperature and finding absolute zero
Week 4	Find the absolute and relative density of a volatile liquid
Week 5	Find the calorimeter constant
Week 6	Report
Week 7	Exam
Week 8	Find the heat of neutralization of a strong acid and a strong base

Week 9	Find the heat of neutralization of a strong acid and a strong base
Week 10	Report
Week 11	Find the heat of neutralization of a weak acid and a strong base
Week 12	Report
Week 13	Finding the thermodynamic constants for a chemical reaction
Week 14	Exam
Week 15	Review the experiences

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Theoretical Physical Chemistry Textbook - Course	Yes
Recommended Texts	Book of basics of physical chemistry	yes
Websites	General and physical chemistry By the author Abdel-Aleem Abu Al-Majd Physical chemistry; By Farrington Daniels Experiments in thermodynamic physical chemistry By the author Ahmed bin Abdul Aziz Al Owais Chemistry elements Physics by Harry Clary Jones Electrophysical chemistry By the author Ali Muhammad Al-Rikabi	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Nano Nanotechnology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-225**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	One	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Athra G. Sager		**e-mail**	asaker@uowasit.edu.iq	
Module Leader's Acad. Title	Assist. Professor 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	01/08/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. allowing students to learn the nature of nano in chemistry 2. Training students to study the chemical and physical properties of the studied topics 3. the preparation and many reactions of nano compounds. 4. the basic principles of advanced nanochemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explains the basic concepts and principles of organic chemistry 2. Classifies organic molecules according to their functional groups and properties. 3. Write the systematic nomenclature for any compound with a functional group. 4. Distinguish between organic reactions such as addition, substitution, or elimination. 5. Apply the necessary chemical principles when performing practical organic chemistry experiments. 6. Follows chemical safety and security instructions during practical experiments. 7. Uses chemicals in a way that ensures his safety and the safety of others inside the laboratory 8. Participate in suggestions and effective solutions in practical experiments. 9. Evaluates the importance of organic chemistry in his environment and daily life.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview of Nanotechnology and its development
Week 2	Properties and classification of nanomaterials
Week 3	Applications of nanotechnology
Week 4	1. Preparation of nanomaterials
Week 5	2. Preparation of nanomaterials

Week 6	Defects in nanocrystalline materials
Week 7	**exam** 1
Week 8	Diagnosis of nanomaterials
Week 9	AFM device
Week 10	EDX/SEM device
Week 11	TEM
Week 12	XRD
Week 13	FT-IR
Week 14	risks and challenges of Nanotechnology
Week 15	Exam.2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Chemical safety and security instructions during experiments
Week 2	Sol-gel (a. Silica).
Week 3	B Separation of nano-silica and burning.
Week 4	c. Diagnosis of nanosilica and studied results
Week 5	Preparation of zinc oxide (sol-gel)
Week 6	Diagnosis of zinc oxide(UV, FTIR)
Week 7	Preparation of silver oxide by sol-gel
Week 8	Diagnosis of silver oxide
Week 9	Exam 1
Week 10	Preparation by green method (preparation of plant extract using ultrasound)
Week 11	Preparation of Zinc oxide (green method)
Week 12	Diagnosis of zinc oxide and comparison with sol-gel method
Week 13	Preparation of iron oxide by green method
Week 14	Diagnosis of iron oxide and study of its magnetic properties.

Week 15	Second month exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اساسيات المواد النانويه أ.د.عباس خماس الساعدى	لا
Recommended Texts	Nano technology : principles and practices /Sulabha K. Kulkarni	لا
Websites	1. https://folk.ntnu.no/fredrol/Nanomaterials%20and%20Nanochemistry.pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Baath Party crimes			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)	**190**				
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	WAGNAA Razaq Abd		**e-mail**	wagna@uowasit.edu.iq	
Module Leader's Acad. Title	Professor/ lecturer		**Module Leader's Qualification**	Master's	
Module Tutor	WAGNAA Razaq Abd		**e-mail**	E-mail wagna@uowasit.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-111	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Teaching students and increasing their awareness by learning about all types of crimes committed by the former regime's party and becoming familiar with all its topics in terms of identifying the concept of crimes and their types. 2- - Identifying the most prominent psychological and physical violations to which the Iraqi people were exposed 3- - Identifying the psychological and social effects of these crimes and providing the student with special knowledge and skills in defending these rights and demanding all their civil and political rights. 4- Providing the student with general knowledge about the basics of the former regime and all the crimes it committed against the Iraqi people of various components and sects, and establishing a conscious generation that rejects all types of injustice, tyranny, and tyranny, and the extent of its demands for all its rights.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- The ability to collect and consolidate information 2- Receiving information correctly

	3- The student can distinguish between the concept of crime linguistically, the concept of crime terminologically, and its concept in all other human sciences. 4- The student's reception and acceptance of the subject 5- The student can distinguish between the types of Baath Party crimes
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • In-class exercises

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies and methods adopted in implementing the program in general. Interactive lectures between the professor and students, exchange of ideas, questions, and group discussions on all topics of Baath Party crimes. Daily and monthly tests. Research reports in order to increase students' ability to understand and understand the crimes of the Baath Party

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to the concept of crimes linguistically and terminologically
Week 2	Crime departments
Week 3	**Baath Party crimes according to the Supreme Criminal Court Law**
Week 4	**Identify international crimes**
Week 5	**Learn about the decisions issued by the Supreme Criminal Court**
Week 6	**Identifying psychological crimes and their most prominent effects**
Week 7	**Identify the mechanisms of psychological crimes**
Week 8	**Identify social crimes**
Week 9	**The Baath Party's position on religion**
Week 10	**Militarizing society.**
Week 11	**Identify environmental crimes**
Week 12	**Identifying mass graves**
Week 13	**Identifying military pollution and the leveling of orchards**
Week 14	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Baath Party crimes approach	Yes
Recommended Texts	Archives of the Political Prisoners Foundation	
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Inorganic Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHE1102**				
ECTS Credits	**8**				
SWL (hr/sem)	**190**				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Hayder Dawood Jasim Arkawazi		**e-mail**	harkawazi@uowasit.edu.iq	
Module Leader's Acad. Title		Associated Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Name (if available)		**e-mail**	harakwazai@uowasit.edu.iq	
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 Aims أهداف المادة الدراسية	1. Get a comprehensive and clear definition of the basics of Inorganic chemistry for year two. 2. Introduction to the reduction, oxidation reactions, and electrochemical cells. 3. Studying group theory and molecules symmetry. 4. Studying solid-state chemistry and ionic molecules. 5. Group fifteen includes N, P, As, Sb, and Bi. 6. Group sixteen including O, S, Se, Te, and Po. 7. Groups 17, and 18.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To be familiar with the basics and rules of oxidation, reduction reactions and electro chemical cells. 2. Ability to know the group theory, symmetry, steric effects. 3. Ionic interactions and solid materials. 4. Group 15, 16, 17, and 18 elements, and their reactions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, discussion and problem solving • Assignments -Evaluation • Daily and monthly exam • 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 type 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 أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	190		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	5% (5)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-3	Oxidation reduction of electrochemical cells
Week 4-7	Symmetry and molecular theory
Week 8-12	Ionic compounds, the structures of ionic compounds. some common systems.
Week 13-14	Groups 15, 16, 17, and 18
Week 15	**Exam**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1-3	Preparation of ammonium sulphate iron (II) sulphate. n hydrate salt. Detection of the resulted ions.
Week 4-7	Preparation of $Na_3[Fe(OX)_3]$ complex
Week 8-12	Preparation of $Na_2[Co(EDTA)]$ complex The characterization of the complex
Week 13-14	Preparation of some multidentate organic ligands, and complexation reactions with transitions metal ions.
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Inorganic Chemistry, 4th edition by Catherine Housecroft, and Alan G. Sharpe. 2. Inorganic Chemistry, 5th edition by G. Missler, and D. Tarr. 3. Inorganic Chemistry, 5th edition by Shriver and Atkins.	Yes
Recommended Texts	Non	No
Websites	Non	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language**			**Module Delivery**	
Module Type	Secondary			☒ **Theory** ☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		Theoritical	**Semester of Delivery**		
Administering Department		Type Dept. Code	**College**	University of Wasit	
Module Leader	Name : Asst. Lect. Israa Ali Al-Aaydi		**e-mail**	aakarem@uowasit.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		Master
Module Tutor	Asst. Lect. Israa Ali Al-Aaydi		**e-mail**	aakarem@uowasit.edu.iq	
Peer Reviewer Name		Professor	**e-mail**	E-mail	
Scientific Committee Approval Date		22/1/2025	**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Not Available	**Semester**	
Co-requisites module	Not Available	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **1.** أهداف المادة الدراسية	1- Identify the fundamentals of English grammar 2- Emphasizing the student's role in the process of understanding, perception and knowledge 3- Presenting most of the grammatical rules and ways to control those rules. 4- Combining theory and application to facilitate the process of understanding and understanding. 5- To emphasize the practical aspect to enhance the understanding process
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowledge and understanding 2- Identify some tenses and how to formulate sentences in English 3 - Getting to know the English language vocabulary, its meanings, and its pronunciation 4 – Practice speaking English through dialogue, questions and answers 5. Teaching the students how to write composition in English
Indicative Contents المحتويات الإرشادية	**The instructive content includes the following:** **•. Teaching and learning methods.** **•. Lectures** **•. Explanation, questions and answers** **•. Assigning tasks (writing reports and homework)** **- Evaluation** **•. Daily and monthly exams** **Answering class exercises .•**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	.1 Explanation and clarification from the subject teacher. .2 Using a pen and blackboard, in addition to using modern teaching methods (computers) and using a method of displaying data when necessary .3 Listening to students' opinions and discussing them .3 .4 Giving students the opportunity to present part of the lecture in an appropriate manner .4 .5 Daily encouraging tests .5 .6

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**Getting to know you** **Tenses – questions**
Week 2	**Using bilingual dictionary** **Social expressions**
Week 3	**Reading – communication**
Week 4	**The way we live** **The names of countries** **Vocabulary – matching verbs with nouns**
Week 5	**Reviewing**
Week 6	**Examination**
Week 7	**Past tenses – simple and past tense**
Week 8	**Using the subordinators 'while' and 'when'**
Week 9	**The parts of speech and their suffixes**
Week 10	**Time expressions and prepositions**
Week 11	**Reviewing**
Week 12	**Examination**
Week 13	**Using 'some and any'** **'Match and many'**
Week 14	**Using 'something / someone / somewhere** **Using the articles**
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New headway beginner student book	Yes
Recommended Texts	Murphy R English Grammar in Use	Yes
Websites		

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.

Description of the Academic Program- Phase 3

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry 3**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-314**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	the third	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Kamal Rashid Hasijan		**e-mail**	kaljorani@uowasit.edu.iq	
Module Leader's Acad. Title	assistant professor		**Module Leader's Qualification**	PhD	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	015/07/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-224	**Semester**	the second
Co-requisites module	Not exist	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To deepen students' understanding of the principles and mechanisms of organic reactions. 2. To develop advanced knowledge of the structure, reactivity, and synthesis of organic compound 3. To enhance students' ability to analyze and predict the outcomes of complex organic reactions. 4. To prepare students for research or professional applications related to organic chemistry, particularly in the fields of pharmaceuticals, materials, or academic research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the course, students will be able to: 1. Explain the basic mechanisms governing substitution, elimination, addition, and rearrangement reactions. 2. Identify key functional groups and predict their behavior under different chemical conditions. 3. Interpret spectroscopic data (infrared, nuclear magnetic resonance, ultraviolet, and mass spectrometry) to determine the structures of organic compounds. 4. Apply knowledge of organic mechanisms to propose appropriate synthetic methods for target molecules. 5. Analyze reaction kinetics and thermodynamic considerations in organic transformations. 6. Integrate theoretical knowledge with laboratory techniques to conduct and report on organic synthesis experiments. 7. Gain scientific experience through practical training in the department's laboratories and medical laboratories affiliated with the Ministry of Health. 8. Work in healthcare and educational institutions, factories, chemical laboratories, and central research laboratories. 9. Develop research and deductive skills.
Indicative Contents المحتويات الإرشادية	**The guiding content includes the following:** **Teaching and Learning Methods:** **1. Lectures:** **Weekly lectures are delivered to explain the theoretical concepts, mechanisms, and applications of organic chemistry. These sessions often use visual aids, reaction diagrams, and practical applications to enhance understanding.** **2. Tutorials/Problem-Solving Sessions:** **Students will practice solving advanced reaction mechanisms, synthesis problems, and spectroscopic interpretation in small groups or guided sessions.** **3. Laboratory Hours:** **Students will conduct organic synthesis experiments, including purification and characterization of products using spectroscopic analysis.** **4. Independent Study:** **Read assigned textbook chapters (especially Morrison and Boyd) and scholarly articles, and complete problem sets and case studies outside of class.** **5. Electronic Resources:** **Supplemental learning materials, such as video lectures, interactive simulations, and quizzes, can be used to reinforce key concepts.** **Assessment Methods:** **1. Midterm Exam:** **A written exam to assess understanding of basic concepts and interaction mechanisms.** **2. Final Exam:** **A comprehensive exam covering interaction mechanisms, structural planning, and problem solving.**

	3. Quizzes/Assignments: **Periodic homework or quizzes focused on problem solving and understanding of basic concepts.** **4. Lab Reports:** **Evaluating practical skills, data interpretation, and report quality.** **5. Participation and Instructional Work:** **Evaluating participation in tutorials, group discussions, and presentations.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course is delivered through a combination of structured lectures, active learning, and independent study to promote in-depth understanding and critical thinking in organic chemistry. Strategies include: 1. Lectures Objective: To introduce the theoretical foundations of reaction mechanisms, stereochemistry, and synthesis strategies. Method: Interactive lectures using molecular models, visual aids (e.g., reaction mechanisms, diagrams), and real-world examples to enhance conceptual understanding. 2. Problem-Based Learning (PBL) Objective: To develop students' ability to apply knowledge to unfamiliar and complex problems. Method: Students work on real or simulated organic chemistry problems, such as designing synthetic pathways, predicting reactions, and elucidating structures from spectral data. 3. Tutorials and Workshops Objective: To reinforce lecture content through group discussions and problem-solving. Method: Small-group sessions focused on challenging problems, exam-style questions, and peer tutoring. Tutorials may include flipped classroom elements. 4. Laboratory Hours Purpose: Apply theoretical knowledge to experimental design, organic synthesis, and compound characterization. Syllabus: Practical experience in conducting organic reactions, purification techniques (e.g., distillation, chromatography), and spectroscopic analysis (e.g., infrared, nuclear magnetic resonance). 5. Independent Learning Purpose: Encourage self-directed learning and critical reading of the scientific literature.

	Syllabus: Guided reading assignments from Morrison and Boyd and primary literature, completion of problem sets, and preparation for assessments. 6. Digital and Electronic Resources Purpose: Support flexible and interactive learning. Syllabus: Use of Learning Management Systems (LMS) to access lecture notes, quizzes, recorded videos, and discussion forums for peer interaction. 7. Formative Assessment and Feedback Purpose: Provide ongoing feedback to guide learning and improve performance. Syllabus: Frequent quizzes, online assessments, and feedback during classes and labs.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
الأسبوع 1	Carboxylic Acids (Introduction, Nomenclature, Physical Properties)
الاسبوع 2	Carboxylic Acids (Methods of Preparation)
الاسبوع 3	Carboxylic Acids (Reactions)
الاسبوع 4	Carboxylic Acid Derivatives (Properties, Preparation Methods, and Reactions)
الاسبوع 5	Acid Chlorides and Acid Anhydrides
الاسبوع 6	Amides and Esters
الاسبوع 7	Amines (Introduction, Nomenclature, Base and Salt Formation, Physical Properties)
الاسبوع 8	Amines (Industrial and Laboratory Preparations)
الاسبوع 9	Amines (Reactions)
الاسبوع 10	Aryl Halides (Introduction, Preparation Methods, and Reactions)
الاسبوع 11	Aryl Halides (Reactions)
الاسبوع 12	Stereochemistry (Introduction to the Topic and Chiral Center)
الاسبوع 13	Stereochemistry (Enantiomers and Diastereomers)
الاسبوع 14	Stereochemistry (Nomenclature, Polarity, Racemic Mixtures, Meso Compounds)
الاسبوع 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
الاسبوع 1	Laboratory Safety
الأسبوع 2	Cannizzaro Reaction (Theoretical Section)
الأسبوع 3	Cannizzaro Reaction (Practical Section)
الأسبوع 4	Preparation of Acetic Acid (Theoretical Section)
الأسبوع 5	Preparation of Acetic Acid (Practical Section)
الأسبوع 6	Preparation of Ethyl Benzoate (Theoretical Section)

الأسبوع 7	Preparation of Ethyl Benzoate (Practical Section)
الأسبوع 8	Preparation of N-Benzylphthalimide (Theoretical Section)
الأسبوع 9	Preparation of N-Benzylphthalimide (Practical Section)
الأسبوع 10	Adol Condensation (Theoretical Section)
الأسبوع 11	Adol Condensation (Practical Section)
الأسبوع 12	Friedel-Crafts Reaction (Theoretical Section)
الأسبوع 13	Friedel-Crafts Reaction (Practical Section)
الأسبوع 14	Theoretical Practical Examination
الأسبوع 15	Practical Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Organic Chemistry / Part Two / Dr. Kamal Rashid Al-Jorani**	Yes
Recommended Texts	1. Robert T. **Morrison** and Robert N. **Boyd**, (Organic Chemistry), Edition 2. Jonathan **Clayden**, Nick Greeves, and Stuart Warren, (Organic Chemistry), Second Edition.	Yes
Websites	1- Canadian Journal of Chemistry https://cdnsciencepub.com/journal/cjc 2- The Journal of Organic Chemistry https://pubs.acs.org/journal/joceah 3- American Chemical Society (ACS) – www.acs.org 4- Royal Society of Chemistry (RSC) – www.rsc.org 5- International Union of Pure and Applied Chemistry (IUPAC) – www.iupac.org	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Inorganic Chemistry 5**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-312**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	The fifth	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Atheer Abdulsahib Ali		**e-mail**	Atheer.ali@uowasit.edu.iq	
Module Leader's Acad. Title	assistant professor		**Module Leader's Qualification**	PhD	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/08/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Not exist	**Semester**	
Co-requisites module	Not exist	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce students to the fundamental concepts of coordination chemistry. 2. Trace the development of the concept from Werner's coordination theory to modern theories. 3. Study the structure and electronic configuration of coordination compounds. 4. Types of ligands (monodentate, polydentate), their classification based on chemical and structur properties. 5. Equip students with the skills to name coordination compounds according to IUPAC nomenclatu rules. 6. Study the physical and chemical properties of coordination compounds and their applications. 7. Study the spatial structure of coordination compounds with different coordination numbers and common geometries: octahedral, square planar, tetrahedral. 8. Study the Valence Bond Theory (VBT) for coordination complexes and explain different hybridization schemes. 9. Distinguish between different types of bonding in coordination compounds, understand the Crystal Field Theory, and learn about the splitting energy in different fields (octahedral, tetrahedra 10. The effect of the crystal field on magnetic and spectroscopic properties. 11. Study the Molecular Orbital Theory (MOT). 12. Study the reactions and mechanisms of formation of coordination compounds. 13. Develop students' ability to connect theoretical concepts with practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of ligand types, denticity, and the ability to name coordination compounds. 2. Understanding and interpreting the nature of bonding in coordination compounds based on Valence Bond Theory (VBT) and Crystal Field Theory (CFT). 3. Differentiating between different types of ligands, coordination numbers, and geometries of coordination compounds. 4. Correctly writing the names and formulas of coordination compounds. 5. Interpreting the magnetic and spectroscopic properties of coordination compounds. 6. Interpreting ultraviolet-visible (UV-Vis) spectroscopy data. 7. Using magnetic data to determine structure and hybridization. 8. Explaining the importance of coordination compounds in industrial, pharmaceutical, and environmental applications. 9. Analyzing experimental data from practical applications or spectroscopic measurements of coordination compounds. 10. Designing simple laboratory experiments for the preparation or analysis of coordination compounds, and understanding reaction mechanisms and stability of coordination complexes. 11. Applications of coordination compounds: 12. In medicine (e.g., platinum complexes in cancer treatment). 13. In industry (e.g., as catalysts). 14. In the environment (treatment of heavy metals and toxic substances in water).
Indicative Contents المحتويات الإرشادية	**The course content includes the following:** **• Teaching and learning methods** **• Lectures** **• Explanations, discussions, and assignments** **• Use of visual aids and models** **• Application and comparison of theories to enhance understanding** **• Motivating students and developing their skills** **• Assigning tasks (writing reports and completing homework)** **• Preparing various chemical compounds in the laboratory and calculating the percentage yield** **• Assessment** **• Daily quizzes** **• Homework assignments and in-class exercises** **• Participation in constructing 3D models of chemical compounds** **• Midterm exams** **• Preparing reports for laboratory experiments with discussion of the results** **• Final examAssessment Methods:** **1. Midterm Exam:** **A written exam to assess understanding of basic concepts and interaction mechanisms.** **2. Final Exam:**

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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The case study highlights the main strategy to be adopted in delivering this unit: interactive lectures through guided discussions, which enhances critical thinking and communication skills, and incorporates brainstorming within the interactive learning environment. Preparation and discussion of some simple coordination complexes (such as vanadium, chromium, and iron complexes) with the students is also included. Teaching and learning strategies for coordination chemistry require a blend of theoretical and practical approaches due to the complexity of this subject and its interrelation with other concepts. First: Teaching Strategies 1. Concept-based teaching (focusing on key concepts) such as: Structure of complexes Types of ligands Crystal field theory Oxidation state and hybridization Presenting concepts gradually, from simple to complex. 2. Using visual aids, diagrams, and 3D models Employing interactive software to display complex structures and using colors to distinguish different types of ligands. 3. Connecting to real-world applications Linking lessons to real-life applications, such as drugs based on complexes (e.g., cisplatin) The importance of complexes in industries (e.g., catalytic complexes) and applications in spectroscopy and chemical analysis. 4. Active learning Group discussions about complex structures, analysis of simplified scientific articles, and practical experiments to distinguish between different types of ligands. 5. Using comparisons Comparing between: Valence Bond Theory and Crystal Field Theory High-spin and Low-spin complexes, and a comparison between Crystal Field Theory and Molecular Orbital Theory Second: Learning Strategies 1. Concept Map A concept map illustrating the relationships between ligands, coordination number, complex geometry, hybridization type, and electron configuration. 2. Problem-Based Learning (PBL) Solving problems related to: calculating oxidation states and electron configurations in crystal fields; determining the type of hybridization and the geometry of the complex. 3. Cooperative Learning Working in groups to solve problems, draw diagrams of complexes, interpret their magnetic and optical properties, and engage in interactive, periodic review sessions.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
الأسبوع 1	The Periodic Table and Introduction to Coordination Chemistry
الاسبوع 2	Theories and Hypotheses in Coordination Chemistry (Chain Theory and Werner's Theory)
الاسبوع 3	Formation of Coordination Compounds, Types of Ligands, and Nomenclature of Complexes
الاسبوع 5-4	Coordination Number, Geometry, and Effective Atomic Number
الاسبوع 6	Hybridization, Types of Orbitals, and Geometries of Complexes
الاسبوع 7	Valence Bond Theory (VBT)
الاسبوع 8	Exam
الاسبوع 9	Crystal Field Theory (CFT) for Octahedral Complexes and Crystal Field Stabilization Energy
الاسبوع 10	Crystal Field Theory (CFT) for Tetrahedral Complexes and Crystal Field Stabilization

	Energy
الاسبوع 11	Factors Affecting Crystal Field Strength and the Jahn-Teller Effect
الاسبوع 12	Molecular Orbital Theory (MOT)
الاسبوع 13	Term Symbol and Spectroscopic Properties of Coordination Complexes
الاسبوع 14	Electronic Transitions and Tanabe-Sugano Diagrams Midterm Exam
الاسبوع 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
الاسبوع 1	Laboratory safety; classification of ligands and coordination complexes; and fundamentals of naming coordination complexes (theoretical part)
الأسبوع 2	Examples and exercises for calculating percentage yield (theoretical part)
الأسبوع 3	Chemistry of vanadium (theoretical part)
الأسبوع 4	Preparation of aqueous ammonium dioxalatovanadyl(IV) complex $(NH_4)_2[VO(C_2O_4)_2].2H_2O$
الأسبوع 5	Preparation of acetylacetonato vanadyl complex $[VO(acac)_2]$
الأسبوع 6	Chemistry of chromium (theoretical part)
الأسبوع 7	Preparation of aqueous potassium trioxalatochromate(III) complex $K_3[Cr(C_2O_4)_3]$
الأسبوع 8	Isomers in coordination complexes (theoretical part)
الأسبوع 9	Preparation of cis-potassium di-aqua dioxalatochromate(III) complex Cis-$K[Cr(C_2O_4)_2(H_2O)_2].2H_2O$
الأسبوع 10	Preparation of trans-potassium di-aqua dioxalatochromate(III) complex Trans-$K[Cr(C_2O_4)_2(H_2O)_2].2H_2O$
الأسبوع 11	Chemistry of iron (theoretical part)
الأسبوع 12	Preparation of aqueous potassium trioxalatoferrate(III) complex $K_3[Fe(C_2O_4)_3].3H_2O$
الأسبوع 13	Preparation of aqueous sodium ethylenediamine tetraacetate ferrate(III) complex $Na[Fe(EDTA)].3H_2O$
الأسبوع 14	Theoretical Practical Examination
الأسبوع 15	Practical Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Coordination Chemistry / Part One / Assistant Professor** **Dr. Atheer AbdulSahib Ali**	Yes
Recommended Texts	1-Inorganic Chemistry, Gary L. Miessler, fifth edition 2-Inorganic Chemistry , CATHERINE E. HOUSECROFT AND ALAN G. SHARPE , fourth edition	Yes
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Heterocycli chemistry			**Module Delivery**	
Module Type	Elective course			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	Che-316				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGII	**Semester of Delivery**		One
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Amaar farman Adod		**e-mail**	ferman@uowasit.edu.iq	
Module Leader's Acad. Title		Assist. Professor 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		01/08/2024	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• To identify and classify different types of heterocyclic compounds. • To learn the nomenclature of heterocyclic compounds according to IUPAC rules. • To study the physical and chemical properties of these compounds. • To understand the concept of aromaticity in heterocyclic systems. • To explore the common chemical reactions of heterocyclic compounds. • To learn the methods of synthesis of heterocyclic compounds. • To recognize the biological and pharmaceutical importance of these compounds. • To develop problem-solving skills related to structure and reaction
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• . • Classify heterocyclic compounds based on ring size and heteroatoms. • Apply IUPAC nomenclature rules to correctly name heterocyclic compounds. • Analyze the chemical structures and identify heteroatoms within the ring. • Explain the physical and chemical properties of heterocyclic compounds. • Describe the concept of aromaticity in heterocyclic systems. • Illustrate common chemical reactions and reaction mechanisms. • Propose suitable methods for the synthesis of heterocyclic compounds. • Relate heterocyclic compounds to their biological and pharmaceutical application
Indicative Contents المحتويات الإرشادية	• • Definition and importance • General examples • **Structure and Classification** • Classification based on ring size (five- and six-membered rings) • Types of heteroatoms (N, O, S) • **Aromaticity in Heterocyclic Compounds** • Concept of aromaticity • Hückel's rule • **Nomenclature** • Common names • IUPAC nomenclature • **Physical and Chemical Properties** • Polarity and solubility

	• Boiling and melting point •

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	

Strategies	• • .
	• **Class Discussions**
	  • Encouraging students to participate in analyzing structures and concepts.
	• **Problem-Solving Sessions**
	  • Practicing naming, reaction mechanisms, and predicting products.
	• **Interactive Learning**
	  • Using questions and in-class activities to enhance engagement.
	• **Student Presentations**
	  • Assigning topics related to types, reactions, or applications.
	• **Group Work (Collaborative Learning)**
	  • Working in groups to solve problems and analyze compounds.
	• **Use of Visual Aids**
	  • Diagrams, molecular structures, and presentation slide

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	An Introduction to Heterocyclic Compounds
Week 2	Naming Heterocyclic Compounds Containing Nitrogen, Sulfur, and Oxygen
Week 3	Preparation of Tricyclic Compounds and Their Chemical Properties
Week 4	Preparation of Tetracyclic Compounds and Study of Their Chemical Properties
Week 5	Preparation of saturated Pentacyclic Compounds and Study of Their Chemical Properties
Week 6	Preparation of Unsaturated Pentacyclic Compounds and Study of Their Chemical Properties
Week 7	Benzo Compounds and Naming of Benzo Compounds: The benzene ring is linked to five rings
Week 8	Preparation of benzo compounds, especially industrial and medical ones

Week 9	Exam
Week 10	Study of the Reaction Mechanisms of Heterocyclic Compounds
Week 11	Perperation of hexagonal compound
Week 12	Student Presentation Seminar
Week 13	Study of Pyridine Compounds and Their Chemical Properties
Week 14	Course Review
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**cycloalkanes**	yes
Recommended Texts	**Organic chemistry**	
Websites	• Rees, Charles W. (1992). "Polysulfur-Nitrogen Heterocyclic Chemistry". *Journal of Heterocyclic Chemistry*. **29** (3): 639–651. Edon Vitaku, David T. Smith, Jon T. Njardarson (2014). "Analysis of the Structural Diversity, Substitution Patterns, and Frequency of Nitrogen Heterocycles among U.S. FDA Approved Pharmaceuticals". *J. Med. Chem*. **57** (24): 10257–10274. doi:10.1021/jm501100b. PMID 25255204	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	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	**Inorganic Chemistry 6**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-322**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Atheer Abdulsahib Ali		**e-mail**	Atheer.ali@uowasit.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**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	01/03/2026		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Inorganic Chemistry	**Semester**	5
Co-requisites module	CHE-312	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introducing the student to how to find the term symbol for transition elements. 2. Studying the spectral properties of coordination compounds. 3. Understanding the rules and conditions of selection and how to identify the most intense coordination compound. 4. Developing the student's skill in determining the absorption spectra of coordination compounds.

	5. Studying the resulting colors of complexes and the factors affecting them. 6. Studying Tanabe-Sukano diagrams and understanding the electronic transitions of coordination complexes. 7. Understanding the mechanisms of deletion and substitution reactions of coordination complexes. 8. Studying the effect of transposition on the spatial structure of square-planar coordination compounds. 9. Studying the stability of coordination complexes. 10. Students will learn about the factors affecting the stability of coordination complexes. 11. Students will learn about carbonyl compounds, their structural bases, and methods of preparation. 12. A seminar will be conducted to support students' research and discussion skills. 13. Students will learn about methods of preparing coordination compounds and connect them to laboratory experiments and procedures. 14. Students will learn about the geometric and spatial shapes of coordination complex isomers. 15. Students will enhance their skills by discussing the seminar and asking questions of their classmates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the terminology and the ability to find it for coordination compounds. 2. Understanding the spectral properties of coordination compounds based on the types of electron transitions. 3. Recognizing how to apply selection rules and deducing the absorption intensity of different coordination compound geometries. 4. Understanding the types of absorption spectra of coordination compounds and the reason for the color variations of coordination complexes. 5. The student will be able to interpret the spectral transitions of coordination compounds using Tanabe-Sakuno diagrams. 6. The student will be able to explain the reason for the difference in reaction mechanisms between different geometric shapes. 7. The student will explain the importance of applying the transposition effect to identify coordination compounds resulting from square-planar substitution reactions. 8. The student will be able to identify methods for determining the stability of coordination compounds, soft acids, and hard bases. 9. The student will be able to distinguish between the factors affecting the thermodynamic stability of coordination compounds. 10. The student will be able to apply the effective atomic number rule and write the chemical formulas of carbonyl complexes.

	11. The student will be able to understand the methods used to prepare coordination complexes theoretically and discuss them in conjunction with practical experiments. 12. The student will be able to identify the types of isomers of coordination compounds.
Indicative Contents المحتويات الإرشادية	Teaching and Learning Methods • Lectures • Explanation, discussion, and assignments • Use of visual aids and models • Applying and comparing theories to enhance understanding • Motivating students and developing their skills • Assigning tasks (report writing and homework) • Preparing various complexes in the lab and calculating the percentage of the product • Assessment • Daily quizzes • Homework and completing class exercises • Participating in constructing the spatial structures of complexes • Midterm exams • Preparing reports for laboratory experiments and discussing the results • Midterm exam

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is through interactive lectures and guided discussions, which will enhance and develop critical thinking and communication skills, as well as utilize brainstorming within the interactive learning program. These lectures will be facilitated through interactive learning activities. Preparing some simple coordination complexes, such as iron complexes, and discussing them with students. Teaching and learning strategies for coordination chemistry require a combination of theoretical and applied methods due to the complexity of this branch and its overlap with other concepts. First: Teaching Strategies 1. Concept-based teaching (focusing on fundamental concepts) such as: the structure of complexes, types of ligands, the theory of effective atomic number and its application to carbonyl complexes, and introducing concepts gradually, from the simplest to the most complex, regarding absorption spectra. 2. Using visual models, diagrams, and models, molecular models, and interactive software to display the structure of complex isomers and use colors to distinguish types. 3. Connecting to reality and practical applications, such as linking lessons to real-life applications like pharmaceuticals that rely on complexes, and the importance of complexes in industries, such as catalytic complexes (and applications in spectroscopy and chemical analysis).

	4. Active learning, such as group discussions about the structure of complexes. Complex analysis and simplified scientific articles, and the use of practical experiments to differentiate between the effects of ligand types on the color and absorption intensity of complexes. 5. Using comparisons: Comparison between: The crystallographic field stability energy of high-spin complexes and low-spin complexes.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	1. Term symbol
Week 2	2. Spectral properties of coordination compounds
Week 3	3. Selection rules and their relationship to absorption intensity
Week 4-5	4. Absorption spectra and their relationship to complex colors
Week 6	5. Tanabe-Sakuno diagrams
Week 7	6. Mechanisms of elimination and substitution reactions of coordination complexes
Week 8	7. Transaction effect of reduction reactions
Week 9	8. Stability of coordination complexes, soft acids, and hard bases
Week 10	9. Factors affecting the thermodynamic stability of compounds

Week 11	10. Metal carbonyls
Week 12	11. Sumner
Week 13	12. Methods of preparing coordination compounds
Week 14	13. Isomers of coordination complexes
Week 15	Mid exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	1- Preparation of Cobalt(III) triethylenediamine chloride
Week 2	2- Preparation of diacetylacetonate diaquacobalt(II)
Week 3	3- Nickel Chemistry
Week 4	4- Preparation of Nickel(II) hexamine chloride
Week 5	5- Preparation of nickel(II) dimethylglycinate
Week 6	6- Copper Chemistry
Week 7	7- Preparation of tetraamine hydrated copper(II) sulfate
Week 8	8- Preparation of trithiourea copper(I) sulfate
Week 9	9- Preparation of copper(II) diglycinate hydrate
Week 10	10- Preparation of diethylenediamine copper(II) nitrate
Week 11	11- Aluminum Chemistry
Week 12	12- Preparation of potassium(III) aluminate trioxalate hydrate
Week 13	Theoretical and Practical Exams
Week 14	Practical Exams

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. 1- Coordination Chemistry / Part Two / Dr. Ath Abdul Saheb Ali	
Recommended Texts	Inorganic Chemistry, Gary L. Miessler, fifth edition Inorganic Chemistry , CATHERINE E. HOUSECROFT AND ALAN G. SHARPE , fourth edition	
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Organic Chemistry			**Module Delivery**	
Module Type	C			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	Che-324				
ECTS Credits	6.00				
SWL (hr/sem)	150				
Module Level	UGIII		**Semester of Delivery**	Six	
Administering Department	Chemistry		**College**	College of Science	
Module Leader	Kamal Rashid Hasijan		**e-mail**	kaljorani@uowasit.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	3/27/2026		**Version Number**	2.0	

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 Aims أهداف المادة الدراسية	This course aims to enable students to: 1- Provide a solid scientific foundation in organic chemistry concepts (structure, properties, and reactions). 2- Develop their understanding of organic reaction mechanisms and their application to practical applications in organic synthesis. 3- Introduce them to stereochemistry and its importance in determining the behavior of organic compounds. 4- Equip them with the skills to name organic compounds according to the IUPAC system. 5- Familiarize them with modern techniques in organic analysis (spectrometry and separation). 6- Clarify the role of organic chemistry in industrial, pharmaceutical, and environmental applications. 7- Develop their ability to solve chemical problems and analyze reactions. 8- Prepare students for advanced studies and scientific research in the field of organic chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**A. Knowledge and Understanding** By the end of the course, the student should be able to: 1. Define the basic concepts in organic chemistry. 2. Explain the electronic structure and physical and chemical properties of organic compounds. 3. Describe the different types of organic reactions. 4. Explain the concepts and types of stereochemistry (chirality, isomerism). 5. Demonstrate the industrial and environmental applications of organic chemistry. **B. Cognitive Skills** 1. Explain the mechanisms of organic reactions. 2. Analyze the steps of reactions and deduce the expected products.

	3. Compare different reactions in terms of mechanism and selectivity. 4. Relate chemical structure to activity or properties. **C. Practical Skills** 1. Apply IUPAC rules for naming organic compounds. 2. Uses spectroscopic techniques such as IR, NMR, and UV to determine structures. 3. Interprets spectroscopic and chromatographic results. 4. Applies knowledge to solve organic reaction and synthesis problems. **H. General and Transferable Skills** 1. Solves scientific problems systematically. 2. Works as part of a team in laboratory experiments. 3. Presents scientific results in an organized manner (reports/presentations). 4. Evaluates the role of organic chemistry in applied fields. 5. Develops a scientific foundation that qualifies him for postgraduate studies and scientific research.
Indicative Contents المحتويات الإرشادية	**First: To achieve knowledge and understanding outcomes:** **Basic concepts in organic chemistry:** (Electronic structure, hybridization, polarity, intermolecular forces) **Classification of organic compounds and functional groups:** (Hydrocarbons, oxygen- and nitrogen-containing compounds) **Physical and chemical properties:** (Boiling point, solubility, acidity, and basicity) **Stereochemistry:** (Chirality, isomerism) **Applications:** (Pharmaceutical, industrial, environmental) **Second: To achieve cognitive skills outcomes:** **Mechanisms of organic reactions:** (Substitution, Addition, Elimination)

	Reaction catalysts: (Carbocations, Carbanions, Free radicals) **Factors affecting reactions:** (Stability, solvent, heat, catalysis) **Analysis of reaction pathways:** (Reaction pathways, product identification, selectivity) **Third: To achieve practical and professional skills outcomes:** **Naming compounds Organic Chemistry:** (IUPAC System Nomenclature) **Spectroscopic Techniques:** (IR, NMR, UV-Vis – Spectral Interpretation) **Separation Techniques:** (Chromatography: TLC, GC, HPLC) **Applications of Organic Synthesis:** (Design of Simple and Multi-Step Reaction Pathways) **Fourth: To Achieve General and Transferable Skills** **Solving Chemical Problems:** (Mechanism Solving, Predicting Products) **Writing Scientific Reports:** (Analyzing Results, Presenting Data) **Linking Concepts to Applications:** (Case Studies from Industry and the Environment) **Self-Learning:** (Referencing and Analyzing Scientific References)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**First: Teacher-Centered Strategies** **Interactive Lecture** Presenting fundamental concepts supported by examples. Using direct questions to stimulate thinking. **Mechanism-Based Teaching**

	Explaining the steps of organic reactions step by step. Bridging theory and practice. **Second: Active Learning Strategies** **Problem-Based Learning (PBL)** Presenting problems related to the mechanisms of reactions and organic synthesis. Encouraging students to analyze and predict products. **Cooperative Learning** Working in small groups to solve problems or discuss topics. Enhancing communication and teamwork skills. **Class Discussions** Discussing the applications of organic chemistry in industry and the environment. Analyzing real-world cases. **Third: Applied Learning Strategies** **Laboratory-Based Learning** Conducting experiments related to organic reactions and separation techniques. Training students on the use of analytical equipment. **Project-Based Learning** Assigning students projects on organic synthesis or industrial applications. Preparing scientific reports and presentations. **Fourth: Higher-Order Thinking Strategies** **Mechanism Analysis** Training students to interpret reaction steps. Comparing different reaction pathways. **Case-Based Learning** Studying pharmaceutical or environmental applications of organic chemistry. Linking theoretical knowledge to real-world problems. **Fifth: Self-Directed Learning Strategies** **Guided Self-Learning** Assigning students specific chapters from the book *Organic Chemistry* by Morrison and Boyd **Using electronic resources** Educational videos, scientific databases, and reaction simulators. **Sixth: Technology-Supported Learning Strategies** **E-Learning** Using educational platforms to upload lectures and assignments, such as Google Classroom Chemical simulations and software, such as ChemSketch Using software to model molecular structures and reaction mechanisms.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10 % (10)	5 and 10	
	Assignments	2	10 % (10)	2 and 12	
	Projects / Lab.	1	10 % (10)	Continuous	All
	Report	1	10 % (10)	13	
Summative assessment	**Midterm Exam**	2hr	10 % (10)	7	
	Final Exam	3hr	50 % (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Phenols (Introduction, Nomenclature, Physical Properties)
Week 2	Phenols (Methods of Preparation)
Week 3	Phenols (Reactions)
Week 4	Carbanion I (Introduction, Nomenclature, Physical Properties)
Week 5	Carbanion I (Methods of Preparation)
Week 6	Carbanion I (Reactions)
Week 7	Carbanion II (Introduction, Nomenclature, Physical Properties)
Week 8	Carbanion II (Reactions)
Week 9	Carbanion II (Methods of Preparation)
Week 10	Alpha-Beta Unsaturated Compounds (Introduction, Nomenclature, Physical Properties)
Week 11	Alpha-Beta Unsaturated Compounds (Methods of Preparation and Reactions)
Week 12	Polycyclic Aromatic Compounds (Classification, Nomenclature, Physical Properties)
Week 13	Polycyclic Aromatic Compounds (Methods of Preparation and Reactions)
Week 14	Heterocyclic Compounds
Week 15	Test

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Laboratory Safety
Week 2	Azo Dye (Theoretical Section)
Week 3	Azo Dye (Practical Section)
Week 4	Reduction of Azo Dye (Theoretical Section)
Week 5	Reduction of Azo Dye (Practical Section)
Week 6	Saponification (Theoretical Section)
Week 7	Saponification (Practical Section)
Week 8	Preparation of Iodobenzene (Theoretical Section)
Week 9	Preparation of Iodobenzene (Practical Section)
Week 10	Preparation of Acetanilide (Theoretical Section)
Week 11	Preparation of Acetanilide (Practical Section)
Week 12	Preparation of *Para*-Acetanilide (Theoretical Section)
Week 13	Preparation of *Para*-Acetanilide (Practical Section)
Week 14	Preparation of *Para*-Nitroaniline (Theoretical Section)
Week 15	Preparation of *Para*-Nitroaniline (Practical Section)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Organic Chemistry / Part Two / Dr. Kamal Rashid Al-Jourani • The college and university website that contains the program guide and courses. • The university's central library provides paper and electronic references. • Lectures by faculty members and courses uploaded to the university's learning platforms. • Research laboratories in the department that contain data and reports of research experiments.	
Recommended Texts	1- Morrison and Boyd (Org. Chem.), sixth edition, Volume 2. 2- McMurry (Org. Chem.), 7th Ed. 3- Organic Chemistry – Paula Y. Bruice 4- Organic Chemistry – Jonathan Clayden, Nick Greev Stuart Warren 5- Advanced Organic Chemistry – Francis A. Carey & Richard J. Sundberg 6- March's Advanced Organic Chemistry – Michael B Smith 7- Spectrometric Identification of Organic Compounds	

	Robert M. Silverstein 8- Organic Chemistry (8th Edition) by L. G. Wade Jr: Books, Whitman College.	
Websites	1- Canadian Journal of Chemistry https://cdnsciencepub.com/journal/cjc 2- The Journal of Organic Chemistry https://pubs.acs.org/journal/joceah 3- American Chemical Society (ACS) – www.acs.org 4- Royal Society of Chemistry (RSC) – www.rsc.org 5- International Union of Pure and Applied Chemistry (IUPAC) – www.iupac.org	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Research methodology**			**Module Delivery**	
Module Type	**basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-327**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGII		**Semester of Delivery**	second	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	علي فاضل جاسم		**e-mail**	ali.fadhil@uowasit.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	Master degree	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/2/2026		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-327	**Semester**	second
Co-requisites module	Not found	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• • **Developing skills in formulating research problems** • **Designing appropriate research methodologies**

	• **Learning various data collection methods** • **Analyzing data and interpreting results** • **Enhancing academic writing skills** • **Adhering to research ethics** • **Applying proper scientific referencing technique**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• • **Identify and formulate a clear research problem** • **Develop appropriate research hypotheses or questions** • **Design a systematic and suitable research plan** • **Select and apply appropriate data collection methods** • **Analyze data using basic statistical techniques** • **Interpret results and relate findings to previous studies** • **Prepare a complete scientific research report according to academic standards** • **Apply ethical principles in research and avoid plagiarism** • **Use proper scientific referencing and citation technique**
Indicative Contents المحتويات الإرشادية	• **Teaching and learning methods:** • Lectures • Explanation and discussion • Assigning tasks (writing reports and homework) • **Assessment:** • Daily and monthly exams • Solving class exercises

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• **Lectures** – Presenting core concepts, research designs, and methodologies. • **Discussion sessions** – Engaging students in analyzing research problems and

	reviewing case studies. • **Workshops / Practical sessions** – Hands-on exercises in data collection, statistical analysis, and academic writing. • **Group projects** – Collaborative research assignments to apply learned skills. • **Assignments and presentations** – Developing problem-solving and communication skills. • **Guided reading and literature review** – Critical evaluation of published research article

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
الأسبوع 1	**Scientific research in reform → البحث العلمي في الإصلاح**

الاسبوع 2	Basics of scientific research → أساسيات البحث العلمي
الاسبوع 3	Stages of scientific research development → مراحل تطور البحث العلمي
الاسبوع 4	Benefits and effects of scientific research
الاسبوع 5	Conditions and requirements of scientific research
الاسبوع 6	Obstacles of scientific research
الاسبوع 7	First month exam
الاسبوع 8	Research plan method
الاسبوع 9	Components of the research plan
الاسبوع 10	Quality of the research plan
الاسبوع 11	Types of scientific research
الأسبوع 12	Steps of the descriptive method
الأسبوع 13	How to write a university research paper
الأسبوع 14	How to write search problem
الأسبوع 15	Second month exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	كتاب منهجية البحث العلمي	yes
Recommended Texts	كتاب اسس البحث العلمي	yes
Websites	Research design pdf	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	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	**Biochemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-321**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		**UG III**	**Semester of Delivery**		TWO
Administering Department		Chemistry Department	**College**	College of Science	
Module Leader	Hussein Sareea Hussein Alshamary		**e-mail**	Husein.ur1@gmail.com	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/2/2026	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-311 (Organic Chemistry II)	**Semester**	One
Co-requisites module	Che-331 (Analytical Chemistry II) Bio-211 (Cell Biology)	**Semester**	One

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- **Module Aims** 1. Provide a comprehensive understanding of nucleic acids (DNA and RNA). 2. Explain enzyme structure, classification, and mechanisms of action. 3. Develop knowledge of bioenergetics and ATP production. 4. Introduce vitamins as essential cofactors in metabolism. 5. Explain hormone classification and mechanisms of action. 6. Enhance laboratory and analytical skills in biochemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the structure and function of DNA and RNA. 2. Explain enzyme activity and influencing factors. 3. Analyze ATP production and energy pathways. 4. Classify vitamins and explain their biological roles. 5. Understand hormone function and regulation. 6. Apply laboratory techniques in biochemical analysis.
Indicative Contents المحتويات الإرشادية	• Lectures • Discussion and problem solving • Assignments • **Evaluation Methods:** • Quizzes and exams • In-class exercises • Laboratory work

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Interactive lectures using diagrams and animations 2. Laboratory experiments for practical understanding 3. Assignments to strengthen problem-solving skills 4. Independent learning through textbooks and online resources

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to nucleic acids and DNA structure**
Week 2	RNA types and DNA replication
Week 3	Transcription and translation
Week 4	Enzyme structure and classification
Week 5	Mechanism of enzyme action
Week 6	Enzyme kinetics (Km, Vmax) and influencing factors
Week 7	**First Month Exam / Midterm Review**
Week 8	Introduction to bioenergetics and ATP
Week 9	Glycolysis
Week 10	Krebs cycle and electron transport chain
Week 11	Fat-soluble vitamins (A, D, E, K)
Week 12	Water-soluble vitamins (B-complex, C)
Week 13	Hormone classification
Week 14	Mechanism of hormone action and signal transduction

Week 15	**Second Month Exam / Final Review**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	DNA extraction
Week 2	Nucleic acid analysis
Week 3	Gel electrophoresis
Week 4	Enzyme activity assay
Week 5	Effect of pH and temperature
Week 6	Enzyme kinetics experiment
Week 7	First Month Lab Exam / Lab Report Submission
Week 8	ATP detection
Week 9	Glycolysis simulation
Week 10	Mitochondrial activity
Week 11	Vitamin C titration
Week 12	Fat-soluble vitamin tests
Week 13	Hormone assay
Week 14	Integrated experiment
Week 15	Second Month Lab Exam / Lab Report Submission and Review of Practical Techniques

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Campbell, M. K., & Farrell, S. O. (2020). Biochemist The Molecular Basis of Life (6th ed.). Cengage Learning**	Yes
Recommended Texts	**1- Campbell, M. K., & Farrell, S. O. (2020). Biochemistry: The Molecular Basis of Life (6th ed.). Cengage Learning** **2- N elson, D. L., & Cox, M. M. (2021). Lehnin Principles of Biochemistry (8th ed.). W.H. Freeman.**	yes

Websites	1. **NCBI Bookshelf. (n.d.).** ***National Center for Biotechnology Information*****. Retrieved from https://www.ncbi.nlm.nih.gov/books/** 2. **PubChem. (n.d.).** ***National Center for Biotechnology Information*****. Retrieved from https://pubchem.ncbi.nlm.nih.gov/**

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Application of Industrial chem**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Che-326**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGIII		**Semester of Delivery**	Six	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Subhi A. Al-bayaty		**e-mail**	salbayaty@uowasit.edu.iq	
Module Leader's Acad. Title	Professor/ 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	01/08/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To provide students with knowledge and understanding of chemical industrial processes. 2. To understand industrial production methods and the factors that influence it. 3. To identify the types of chemical industries present in Iraq. 4. To identify the types of industrial reactions and their catalysts. 5. To understand the mechanisms of industrial reactions in various types of chemical industries.

	6. To understand the impact and quality of raw materials on the final product and its yield. 7. To equip students with the specific skills that will contribute to preparing them as qualified graduates capable of entering the job market. 8. To enable students to apply concepts and skills to solve industrial problems. 9. To enable students to improve and increase the efficiency of industrial processes by selecting optimal conditions of concentration, temperature, pressure, and the use of catalysts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The ability to understand water treatment methods and the effect of hardness on subsequent processes. 2. The ability to understand types of raw materials and their effect on the product, as well as chemical testing methods. 3. The ability to understand the industrial reactions of various types of phosphate fertilizers and urea, and the most important influencing factors. 4. The ability to understand the factors affecting ammonia and urea production. 5. The ability to understand the effect of chemicals on paper preparation and testing methods. 6. The ability to understand the chemical mechanisms of industrial acid preparation and preparation methods. 7. The ability to understand sugar production methods and the factors affecting production. 8. The ability to acquire knowledge of pollutants in the petroleum industry and methods for reducing them.
Indicative Contents المحتويات الإرشادية	The guiding content includes the following: - Teaching and learning methods • Lectures • Explanation, discussion, and problem solving • Assignment tasks (report writing and homework) - Assessment • Daily exams • Homework • Completing classroom exercises • Midterm exam • Preparing research reports for case studies

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this unit is through interactive lectures by way of guided discussions, which leads to improving and developing critical thinking skills and communication skills, as well as using brainstorming to know the impact of industrial variables and their effect on the outcome and risk management, as well as studying the case in industrial reality and providing solutions to it through the concepts that have been acquired. This will be achieved through the classroom and the interactive educational program.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Water treatment - Introduction - substances found in water - Harmful effects of hardness - Industrial uses - Specifications
Week 2	Water treatment using chemical methods - disinfection process - ion exchange methods and other methods - industrial water preparation
Week 3	Cement - Raw Materials - Stages of Cement Production - Clinker - Cement Hardening Process
Week 4-5	Chemical tests of cement - Types of cement
Week 6	Glass and its raw materials
Week 7	Chemical reactions of glass production - Types of glass
Week 8	Phosphate fertilizers - impurities and their effects - types and production methods - phosphoric acid production
Week 9	Ammonia gas production – Factors affecting the rate and yield of ammonia – Urea production – Factors affecting the conversion of ammonium carbamate
Week 10	Paper production - Types of chemical methods - Stages of converting pulp to paper - Additives - Testing
Week 11	Sulfuric acid production - contact method - lead chamber method

Week 12	Nitric acid production - reaction mechanism according to the three stages
Week 13	Sugar production from sugarcane and sugar beets
Week 14	Corrosion and its reduction in the oil industry
Week 15	Mid exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	2. Chemical process Industries by Norris Shreve 3. Unit Operations of Chemical Engineering by McCabe, Smith and Harriott 4. اسس وتطبيقات في الكيمياء الصناعية / د. لطيف حميد علي **5.** اسس الكيمياء الصناعية / د. عزيز احمد امين	
Recommended Texts	اسس الكيمياء الصناعية / د. عزيز احمد امين	
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrochemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		tow
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Sarah Badri Jasim		**e-mail**	saltaiy@uowasit.edu.iq	
Module Leader's Acad. Title		Professor/ 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		1/08/2025	**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 Aims أهداف المادة الدراسية	1- Obtain a comprehensive and clear ideas and information to understand the principle of the real gases and identical behavior of gases. 2- Learn how to solve the different problems in kinetic chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students learned about the ideal gas 2. Students learned about the real gas 3. Students learned the principle of kinetic chemistry 4. Students learned how to calculate the rate of reactions. 5. Students learned about the rate constant and hale time of each kinetic chemical reaction.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Methods of teaching and learning • Lectures • Using recitation, problem solving and go to some chemical manufactures to see the kinetic process. • Assignments -Evaluation • Daily and monthly exam • In-class exercises • Group discussion

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 and by considering type 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	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	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	Principle of Electric chemistry
Week 2	Types of electric circle
Week 3	Real gas
Week 4	Ideal gas
Week 5	Types to electrodes
Week 6	presentation
Week 7	**First month exam**
Week 8	Oxidation and reduction
Week 9	Electrical Cell
Week 10	The relation between thermodynamic and electric chemistry
Week 11	presentation
Week 12	Galvanic cell
Week 13	Other types of orders of electrodes
Week 14	The relation between electric chemistry and industrial applications
Week 15	**Second month exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Calculate the conductivity
Week 2	Conductivity and pH
Week 3	Saponification at equal concentration
Week 4	Saponification at different concentration
Week 5	Standard electrode
Week 6	Working electrode
Week 7	Hydrolysis of electrical cell
Week 8	Molar conductivity of strong electrolytes
Week 9	**Exam**
Week 10	Calculate the dissociation constant
Week 11	Calculate the dissociation degree
Week 12	Titration of weak acid with a strong base
Week 13	Electrochemistry : Oxidation and reduction
Week 14	Application of electrical cell
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Physical Chemistry: A Molecular Approach Textbook by Donald A. McQuarrie and John Douglas Simon	Yes
Recommended Texts	Atkins' Physical Chemistry Textbook by James J. Keeler, Julio de Paula, and Peter Atkins	yes
Websites	Royal chemical society American chemical society Khan Academy	

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
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	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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