

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and Course Description Guide

2025–2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: .Diyala.....

Faculty/Institute: .Science

Scientific Department: Chemistry.....

Academic or Professional Program Name: Academic Program of the
Department of Chemistry

Final Certificate Name: Bachelor's.....

Academic System :, Bologna path for the first, second and third stages and
Semester system for the fourth stage

Description Preparation Date: 1-9-2025

File Completion Date: 1-9- 2025

Signature:



Head of Department Name:

Assist. Prof. Wassan Baqir Ali

Date: 1-9-2025

Signature

Scientific Associate Name

prof .Dr, Munther Hamza Radhi



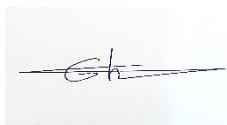
The file is checked by: Assist Prof Ghasan Sabeeh Mahmood

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 1-9-2025

Signature:



Approval of the Dean

Prof. Dr. Taha Mohammad Hasan

Approval of the Dean

1. Program Vision

The program aspires to prepare a special quality of high-level graduates with an academic background that combines the required basic knowledge and skills that qualifies them to meet the needs of society and graduate a generation of researchers capable of solving its problems in a scientific manner. The department also looks forward to progressing and upgrading a distinguished faculty and striving to have its research included in the lists of internationally prestigious scientific journals. . The department's academic programs must be distinguished and high-quality in both its teaching and research aspects.

2. Program Mission

The program's mission is an Complementary part of the mission of the College of Science, which works hard to benefit from all types of knowledge of science and knowledge to provide society with qualified and efficient scientific cadres in solving the many dilemmas in the fields of industry, agriculture, health, environment, and others, in addition to opening horizons of cooperation with the various service and academic institutions and departments of the state to determine the country's need. Actual research keeping pace with scientific, technical and industrial development at the international level.

3. Program Objectives

- Preparing specialists familiar with the basics of chemistry in theory and practice who are able to fill the need of the labor market, in addition to teaching chemistry to students of other departments in the College of Science and some other colleges at the university.
- Conducting scientific research and trying to keep pace with the scientific development of chemistry.
- Cooperating with state institutions and the private sector by providing advice

and scientific advice and conducting chemical analyses.

4. Program Accreditation

No

5. Other external influences

Is there a sponsor for the program?

No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	6	12	%8	
College Requirements	4	24	%15	
Department Requirements	24	120	%76	
Summer Training				
Other				

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

7. Program Description

Semester	No.	Module Code	Module Name in English	Credit Hours	
One	1	Che-1111	Qualitative Analytical Chemistry	2	2
	2	Che-1112	Inorganic Chemistry I	3	
	3	Che-1103	Physics	2	2
	4	Che-1104	Safety and chemical security	3	
	5	UD12	Arabic Language	2	
	6	Che-1106	Mathematics	2	

Semester	No.	Module Code	Module Name in English	Credit Hours	
Two	1	Che-1217	Volumetric Analytical Chemistry	2	2
	2	Che-1218	Inorganic Chemistry II	3	
	3	UD14	Human and democracy	2	
	4	Che-12010	Cytology	2	2
	5	UD13	Computer I	2	2
	6	UD11	English Language 1	2	

Semester	No.	Module Code	Module Name in English	Credit Hours	
Three	1	Che-23113	Gravimetric analytical chemistry	2	2
	2	Che-23114	Inorganic Chemistry III	3	2
	3	Che-23115	Thermodynamic Chemistry I	3	2
	4	Che-23116	Organic Chemistry I	3	2
	5	Che-23017	Nanotechnology	2	
	6	UD23	Computer II	2	2
	7	UD22	Arabic Language 2	2	

Semester	No.	Module Code	Module Name in English	Credit Hours	
Four	1	Che-24119	Separation methods	2	2
	2	Che-24120	Inorganic Chemistry IV	3	2
	3	Che-24121	Thermodynamic Chemistry II	3	2
	4	Che-24122	Organic Chemistry II	3	2
	5	UD24	Baath Party Crimes in Iraq	2	
	6	Che-24024	Statistics	3	
	7	UD21	English Language 2	2	

Semester	No.	Module Code	Module Name in English	Credit Hours	
Five	1	Che-35126	Coordination Chemistry I	3	2
	2	Che-35127	Kinetic chemistry	3	2
	3	Che-35128	Organic chemistry III	3	2
	4	Che-35129	Biochemistry I	3	2
	5	Che-35130	Industrial Chemistry I	3	
	6	Che-35031	Optional I	2	

Semester	No.	Module Code	Module Name in English	Credit Hours	
Six	1	Che-36132	Coordination Chemistry II	3	2
	2	Che-36133	Electrochemistry	3	2
	3	Che-36134	Organic chemistry IV	3	2
	4	Che-36135	Biochemistry II	3	2
	5	Che-36136	Industrial Chemistry II	3	
	6	Che-36037	Optional II	2	

Year/Level	No.	Module Code	Module Name in English	Credit Hours	
Fourth/ 1 st semester	1	Che-4850	Graduation research project		2
	2	Che-4741	Quantum chemistry	3	
	3	Che-4742	Polymer chemistry	2	2
	4	Che-4739	Metabolic chemistry 1	2	2
	5	Che-4738	Spectroscopic analysis	3	2
	6	Che-4740	Organic diagnosis 1	2	2
	7	Che-4743	Hormones	2	
	8	Che-4744	English language 4	2	

Year/Level	No.	Module Code	Module Name in English	Credit Hours	
Fourth/ 2 nd semester	1	Che-4850	Graduation research project		2
	2	Che-4848	Molecular spectra	2	2
	3	Che-4849	Petroleum chemistry and petrochemicals	2	2
	4	Che-4846	Metabolic chemistry 2	2	2
	5	Che-4845	Electrolytic analysis	2	2
	6	Che-4847	Organic diagnosis 2	2	2
	7	Che-4851	Clinical Chemistry	2	

8. Expected learning outcomes of the program

Knowledge

Learning Outcomes 1

- Enabling students to obtain knowledge and understanding of the intellectual framework of chemistry.
- Enabling students to obtain knowledge and understanding of international chemical standards.
- Enabling students to obtain knowledge and understanding of the laws of chemistry.
- Enabling students to obtain knowledge and understanding of chemical analysis standards.
- Enabling students to obtain knowledge and understanding of the law of misuse of chemicals.

Skills

Learning Outcomes 2

The solutions to many of the problems that computer scientists solve are not always obvious and instead require these individuals to think outside the box.

Learning Outcomes 3

Collaboration is often necessary in professional settings. Students must learn to work effectively in teams, communicate clearly, resolve conflicts, and assume leadership roles when necessary.

Ethics

Learning Outcomes 4

Graduates will learn about ethical dilemmas in the field of handling chemical compounds, adhere to professional codes of conduct, and respect the principles of privacy and security.

Learning Outcomes 5

Understand the ethical, social and legal issues related to work in all areas of chemistry and demonstrate ethical behavior and professional responsibility in all aspects of their work

9. Teaching and Learning Strategies

Providing students with the basics and topics related to knowledge and systems described in:

A - Clarification and explanation of study materials by the academic staff through the blackboard, smart board, and computer.

B- Providing students with knowledge through homework assignments for academic vocabulary

C- Asking students to visit the library to obtain additional knowledge of academic subjects

D- Improving students' skills by visiting websites to obtain additional knowledge of academic subjects

10. Evaluation methods

Daily and monthly tests with multiple-choice questions for academic subjects

- Grades for sharing difficult competitive questions for students
- Assigning grades to assigned homework
- Student activities

11.Faculty						
Faculty Members						
Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	chemistry	Biochemistry			3	
professor	chemistry	Physical chemistry			1	
Professor	chemistry	Organic chemistry			1	
Professor	chemistry	Inorganic chemistry			1	
Professor	chemistry	Analytical chemistry			1	
Assistant Professor	chemistry	Industrial chemistry			4	
Assistant Professor	chemistry	Analytical chemistry			1	
Assistant Professor	chemistry	Physical chemistry			2	
Assistant Professor	chemistry	Biochemistry			4	
Assistant Professor	chemistry	Organic chemistry			3	
Assistant Professor	chemistry	Inorganic chemistry			3	
Lecturer	chemistry	Organic chemistry			3	
Lecturer	chemistry	Biochemistry			4	
Lecturer	chemistry	Physical chemistry			2	
Lecturer	chemistry	Analytical chemistry			1	
Lecturer	Mathematics	Pure mathematics			1	
Assistant Lecturer	chemistry	Organic chemistry			2	
Assistant Lecturer	chemistry	Inorganic chemistry			4	
Assistant Lecturer	chemistry	Physical chemistry			5	
Assistant Lecturer	chemistry	Analytical chemistry			3	
Assistant Lecturer	chemistry	Biochemistry			1	

Professional Development

Mentoring new faculty members

By participating in training courses, seminars and workshops on modern teaching methods

Professional development of faculty members

- Follow up on scientific development by contacting international universities via the Internet
- Participation in scientific conferences inside and outside the country
- Participation in scientific workshops and seminars inside and outside the country
- Field visits in industrial projects.

12.Acceptance Criterion

((Central - Scientific)

According to the requirements of the Ministry of Higher Education and Scientific Research, so that it matches the latest admission requirements in Iraqi universities

13.The most important sources of information about the program

- Methodological books approved by the sectoral committee for colleges of science.
- The website of the college and university
- Helping books
- Local scientific trends
- Global scientific requirements

14.Program Development Plan

Curriculum development: By adding modern topics that keep pace with the continuous development in chemistry. Developing and training faculty members: through their participation in seminars, courses, and attendance at scientific conferences for the purpose of being informed of the latest developments. Laboratory development: In cooperation with the Deanship of the College, work is being done to develop the laboratories of the Chemistry Department

Program Skills Outline

				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First / 1 st semester	Che-1111	Qualitative Analytical Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-1112	Inorganic Chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-1103	Physics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-1104	Safety and chemical security	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD12	Arabic Language	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-1106	Mathematics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
First / 2 nd semester	Che-1217	Volumetric Analytical Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-1218	Inorganic Chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD14	Human and democracy	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-12010	Cytology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD13	Computer I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD11	English Language 1	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Two/ 3 rd semester	Che-23113	Gravimetric analytical chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-23114	Inorganic Chemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-23115	Thermodynamic Chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-23116	Organic Chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-23017	Nanotechnology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD23	Computer II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD22	Arabic Language 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Two / 4 th semester	Che-24119	Separation methods	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-24120	Inorganic Chemistry IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-24121	Thermodynamic Chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-24122	Organic Chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√

	UD24	Baath Party Crimes in Iraq	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-24024	Statistics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD21	English Language 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Third/ 1 st semester	Che-35126	Coordination Chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-35127	Kinetic chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-35128	Organic chemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-35129	Biochemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-35130	Industrial Chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-35031	Optional I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Third/ 2 nd semester	Che-36132	Coordination Chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-36133	Electrochemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-36134	Organic chemistry IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-36135	Biochemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-36136	Industrial Chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-36037	Optional II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Fourth/ 1 st semester	Che-4850	Graduation research project	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4741	Quantum chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4742	Polymer chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4739	Metabolic chemistry 1	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4738	Spectroscopic analysis	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4740	Organic diagnosis 1	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4743	Hormones	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4744	English language 4													
Fourth/ 2 nd semester	Che-4850	Graduation research project	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4848	Molecular spectra	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4849	Petroleum chemistry and petrochemicals	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4846	Metabolic chemistry 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4845	Electrolytic analysis	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	Che-4847	Organic diagnosis 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√

	Che-4851	Clinical Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
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- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Level One

Semester One

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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

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

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

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

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

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

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

Fail Group	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Inorganic Chemistry I		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Che-1112			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Jinan Mohammed Mahmoud		e-mail	jinan.mohammed@uodiyala.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	01/06/2023		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This module aims to: 1. Introduce the fundamental principles of inorganic chemistry, including atomic structure, chemical bonding, periodicity, and redox chemistry. 2. Develop an understanding of the periodic table as a tool for predicting the physical and chemical behavior of elements, particularly main group (s- and p-block) elements. 3. Explain the structure and bonding of molecules and solids, using classical and modern bonding theories such as VSEPR and Molecular Orbital Theory. 4. Familiarize students with acid-base and redox concepts, relevant to inorganic systems, including the use of oxidation numbers and acid-base classifications. 5. Explore the structures of crystalline solids, including types of unit cells and how they relate to material properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals 1- Enable students to obtain knowledge and understanding of inorganic chemistry. 2- Enable students to obtain knowledge and understanding of the chemical elements in the periodic table. 3- Enable students to obtain knowledge and understanding of the chemical structures of inorganic compounds. 4- Enable students to obtain knowledge and understanding of reactions in inorganic chemistry. 5- Enable students to obtain knowledge and understanding of practical experiments in inorganic chemistry. B - The soft skills objectives of the course 1 - knowledge skills - remembering. 2 - application and analysis skills. 3 - Use and development skills. 4- evaluation and creativity skills.
Indicative Contents المحتويات الإرشادية	This semester focuses on the study of atomic structure and the electronic configuration of elements, along with their arrangement in the periodic table according to groups and periods. The course covers the rules and regulations governing the allowed orbitals for electron placement in the main shells. It also explores the periodic

	properties of elements. Additionally, the course addresses the atomic states (term symbols) of elements to facilitate investigation into the properties and crystal structures of ionic compounds.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
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 11	LO #3, #4 and #6, #9
	Assignments	2	10% (10)	4 and 12	LO #5, #7 and #10, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #1, #2 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction about inorganic chemistry , Atomic structure :Basic structure atom , Rutherford nuclear atom, The origins of radiation, Wave properties of radiation , intra nuclear processes radioactivity.
Week 2	Theory of Bohr's model of hydrogen atom : Fall through Bohr theory and hydrogen-like atoms, modification of Bohr's theory (Elliptical Orbit , Zeeman effect, Fine structure).
Week 3	De Broglie Waves in the hydrogen Atom , Heisenberg' s uncertainty principle , The Schrödinger equation, Quantum numbers.
Week 4	Examples and solutions
Week 5	Atomic orbital's
Week 6	Periodic table , Reading the periodic table, Electron configuration :Aufbau principle , Pauli exclusion principle , Hund's rules of maximum multiplicity
Week 7	Classification of elements : Based on their general properties , the representative elements.
Week 8	Midterm Exam
Week 9	Atomic Term symbols: Assigning Term symbols , Microstates.

Week 10	Examples and solutions
Week 11	Periodic Trends :Shielding and effective nuclear charge.
Week 12	Ionization Energy (IE)or Ionization Potential (IP) , Atomic radius, Metallic radius .
Week 13	The electronegativity :Calculation of electronegativity .
Week 14	Electron affinity.
Week 15	Examples and solutions
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	الكيمياء اللاعضوية ، تأليف الدكتور ثناء جعفر محمد الحسني ، 1989	Yes
Recommended Texts	Inorganic Chemistry principles of structure and reactivity 4th ed, by James E. Huhhey et al, Harper Collins college Puplishers (1993) Inorganic Chemistry, 5th Edition; Gary. L. Miessler and	No

	Donald . A. Tarr (2014).	
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-1103		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
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	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To provide students with a strong foundation in the fundamental principles of physics. 2. To prepare qualified specialists in general physics and its practical applications, capable of addressing national development needs and meeting the demands of the job market across governmental institutions and industrial sectors. 3. To cultivate an educated generation equipped with scientific knowledge and methodologies, fostering critical thinking, analysis, and adaptability to technological advancements, in line with the expanding needs of society. 4. To strengthen the university's engagement with society by offering expert consultancy, training programs, and professional development opportunities for both academic and administrative staff. 5. To prepare graduates specialized in physics, who are ready to contribute meaningfully to national progress and development. 6. To fulfill the demands of various sectors by providing highly qualified personnel in the field of physics. 7. To encourage outstanding students in physics to join the department as teaching assistants, paving the way for their future roles as members of the academic teaching staff.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Describe the major concepts in physics. Demonstrate an appropriate level of competency in both computer and research laboratory skills. Formulate hypotheses and devise and perform experiments to test a hypothesis as individuals and in a team. Effectively apply current technology and scientific methodologies for problem solving in various scientific, professional and community settings. Effectively use and critically evaluate current technical/scientific research literature, online information, as well as information related to scientific issues in the mass media. Integrate and relate scientific knowledge learned from classroom with real life situations. Communicate in written and oral forms with interested citizens and professionals on key concepts in physics and general scientific issues.

	Work cooperatively as part of a research team. Maintain life-long learning in the sciences and incorporate new information into the existing body of knowledge. Outline the applications of physics in industry and the role of physicists as entrepreneurs.
Indicative Contents المحتويات الإرشادية	• Mechanics - kinematics, forces, work and energy, momentum, circular motion, rotational motion • Materials • Fields - static electricity • Waves/light - sound, optics, • Electricity/magnetism - d.c. electricity, a.c. electricity, motors, generators, transformers • Atomic/nuclear • Particle physics • Astronomy/cosmology • Medical physics • Thermodynamics - heat, temperature • Quantum physics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	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	5	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Measurement, Dimensions, Units of measurement, Measurement systems, Dimensional analysis
Week 2	Vectors and their compounds, Unit vectors
Week 3	Vector Addition and Multiplication of Vectors
Week 4	Linear motion in one dimension
Week 5	Force and its types and Newton's laws of motion
Week 6	Equilibrium and Work
Week 7	Energy and Power
Week 8	Midterm Exam
Week 9	Material properties, Density, Elasticity and Hooke's law
Week 10	Electrostatics, Coulomb's law and Electric field
Week 11	Capacitors and Electric current
Week 12	Resistors and Ohm's
Week 13	Electric potential
Week 14	Magnetism and Magnetic field
Week 15	Biot-Savart's law and Ampere's
Week 16	final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Safety instructions in the laboratory
Week 2	Explain how to write a report and chart
Week 3	Ohm's law
Week 4	Calculate the resultant forces that meet at one point using the vector method, and verify the validity of the result by drawing squares on the forces board
Week 5	Find the ground Acceleration using a Pendulum
Week 6	Calculate the melting point of the wax from the cooling curve
Week 7	Calculating the focal length of a lens by displacement method

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamental of Physics (Halliday, Resnick, and Walker).	Yes
Recommended Texts	Electromagnetic theory (book). 2000.vol.1	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electricalengineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Safety and chemical security		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Cos-1104		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Noor Sabah Ahmed		e-mail
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification
Module Tutor	Name (if available)		e-mail
Peer Reviewer Name	Name		e-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To teach students the fundamental principles of chemical safety and promote awareness of potential hazards in laboratory environments. 2. To provide students with essential knowledge of proper laboratory design and specifications, ensuring a safe and efficient working environment. 3. To develop students' understanding of the correct application of safety and security protocols in chemical laboratories. 4. To train students on the proper handling and usage of chemicals and laboratory glassware, fostering good laboratory practices. 5. To encourage critical thinking by assigning external questions as homework, giving students the opportunity to analyze, explore, and find solutions independently. 6. To motivate students to conduct reports and research related to their coursework, promoting the use of modern research tools and technologies—such as the internet—to enhance their scientific and research skills. 7. To prepare graduates specialized in chemistry who are equipped to contribute effectively to the country's scientific and industrial development. 8. To meet the demands of various sectors by providing highly qualified professionals** in the field of chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the subject, students will be able to: (a) apply the basic and common techniques used in biological and chemical laboratories; (b) comply with the general laboratory safety, the biological safety and the chemical safety regulations; (c) use laboratory equipment, apparatus, and preparation of reagents and solutions correctly; (d) perform accurate observations in laboratory practices; (e) write the laboratory report in a properly written form with data
Indicative Contents المحتويات الإرشادية	Laboratory Safety General laboratory safety practices; Hazards and risk assessment; General principles of biosafety; Basic laboratories – Biosafety Levels 1 and 2; Equipment designed to reduce biological hazards;

	Safe laboratory techniques; disinfection and sterilisation; Hazards associated with chemicals and chemical waste; General knowledge on the handling, storage and disposal of chemicals and chemical wastes; Personal protection and protective clothing for handling of potentially hazardous chemicals, chemical wastes and spillages; Laws pertaining to the handling and storage of chemicals: dangerous goods, controlled chemicals, dangerous substances used in industry, disposal of chemical waste and others.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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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	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Chemical Safety and Security, general Chemistry Safety and Laboratory Rules
Week 2	Common Laboratory Glassware and Equipment
Week 3	General information to laboratory staff ,Chemical storage and how to store chemical.
Week 4	Acids Bases and Salts
Week 5	Lab Safety Symbols and Hazard Signs
Week 6	Principles of Green Chemistry
Week 7	LABORATORY CHEMICAL WASTE MANAGEMENT
Week 8	Midterm Exam
Week 9	Lab building requirements
Week 10	Rules and precaution need to deal safely with chemicals.

Week 11	Personal protection equipment, chemicals handling and transfer to the department in the safe way
Week 12	Lab accidents and how to deal with, avoiding and protection from fires,
Week 13	chemical waste storage, burning and disposal
Week 14	Selling and purchasing of chemicals, receiving, recording chemical data, delivery to storage,
Week 15	safe storage of solvents, flammable and explosive chemicals
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Estridge, B.H. & Reynolds, A.P. (2012). Basic Clinical Laboratory Techniques. (6th ed.), Thomson Delmar Learning Publishers.	
Recommended Texts	Bisen P.S. (2014). Laboratory Protocols in Applied Life Sciences. CRC Press.	

	Brown J.K. Biotechnology (2011). A Laboratory Skills Course. (1st ed.), Hercules BioRad Laboratories. Fleming & Hunt (Editors) (2017). Biological Safety Principles and Practices. (5th ed.), ASM Press.	
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	Mathematics		Module Delivery
Module Type	Support		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-1106		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Suhad Kareem Hamid		e-mail suhadkareem@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Teaching the student functions and the concept of continuity for functions and inequalities, as well as derivation, methods of integration and operations on them, and how to use them in various scientific subjects and harness them to solve mathematical problems that they face in various scientific subjects. Teaching and educating students on all the necessary and necessary information related to mathematics, which qualifies them to model scientific concepts into mathematical equations..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals A1- Enabling students to obtain knowledge and understanding of modern mathematics A2- Enable students to obtain knowledge and understanding of the structure of functions and equations, test their properties, and perform integrations and differentials on them. A3- Enabling students to obtain knowledge and understanding of mathematical integrations and differentials of functions. A4- Enabling students to obtain knowledge and understanding of numerical analysis methods and types of equations B - The soft skills objectives of the course B1 - the skill of knowing - remembering B2 - Memory and analysis skills B3 - Use and modeling skills
Indicative Contents المحتويات الإرشادية	Subtraction-minus, greater than, take away, fewer than, less than, subtract, decreased by. Multiplication-product, multiply, multiplied by, times. Division-quotient, dividend, divide, divided by, each, per, average, divided equally. Equal-the same, equals, the same as, equivalent, is equal to.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard.
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	Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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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	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Limits and continuity ,Estimating limits from graphs, Estimating limits from tables Formal definition of limits (epsilon-delta),Properties of limits,Limits by direct substitution, Limits using algebraic manipulation, Strategy in finding limit
Week 2	Continuity at a point, Continuity over an interval, Removing discontinuities, Infinite limits , Limits at infinity, Intermediate value theorem
Week 3	Derivatives: definition and basic rules, Estimating derivatives, definition and basic rules Differentiability, definition and basic rules, Power rule, chain rule and other More chain rule practice,chain rule and other advanced topic
Week 4	Implicit differentiation, Implicit differentiation (advanced examples), Differentiating inverse functions, Derivatives of inverse trigonometric function
Week 5	Second derivatives, Disguised derivatives, Logarithmic differentiation, exponentials differentiation
Week 6	Applications of derivatives,Approximation with local linearity, Applications of derivatives L'Hôpital's rule, L'Hôpital's rule, composite exponential functions
Week 7	Integrals ,Indefinite integrals of common functions, Integrals .Definite integrals of common Integrating with u-substitution,
Week 8	Midterm Exam
Week 9	Integrating using long division and completing the squares Integrating using trigonometric identities

Week 10	Integration of rational function, Integration by parts, Integration by fraction partition
Week 11	Sequences, Series and the integral test, Comparison tests
Week 12	Alternating Series, absolute convergence, ratio and root tests
Week 13	Strategy for testing series, Power series, representations of functions as power series
Week 14	Taylor and Maclaurin series
Week 15	Applications of Taylor polynomials
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<i>Foundations of the Calculus</i> , DeBaggis, Henry F.; Miller, Kenneth S. (1966) Differential and Integral Calculus, Philip Franklin .	Yes
Recommended	Limits and Continuity, Teddy C. J. Leavitt	No

Texts		
Websites	https://www.cuemath.com/calculus/	

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 1		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UD12			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGI	Semester of Delivery		
Administering Department	All	College	All	
Module Leader			e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name(if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	3/11/2024	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	
Module Objectives أهداف المادة الدراسية	الهدف الأساس في تدريس اللغة العربية للأقسام العلمية : • اخذ الطالب الى روعة بيان القرآن الكريم ، وادراكه يقينا ان التعبير القراني تعبير فني مقصود ، كل لفظة ، وكل حرف وضع وضعافنياً مقصوداً • تقويم اللسان العربي . واعتماد العربية الفصحى في الحديث والكتابة ، ولزيادة رصيد الطالب من ادب وراث ، على تناول النصوص المختارة من العصور الأدبية المختلفة ، لزيادة رصيد ادب لثراث والادب المعاصر . • التأكيد على دور الطالب في المتابعة واثراء المعرفة باللغة العربية وفنونها بجهد خاص ، ذا ما وضعنا مفاتيح المنهاج الدراسي لتقع على الطالب بعد ذلك مهمة فتح الأبواب والنوافذ الى مصادر المعرفة الواسعة . في جعل العربية الفصيحة تحتل موضع الصدارة وتجاوز العامة ، خدمة الى لغتنا العربية المقدسة . وحفاظا على قوتها وجمالها . • ومن نافلة القول في اهداف تدريس اللغة العربية : هي الجانب المحقق للوحدة وتلزمنا دوافع الوفاء بالحرص عليها والمحافظة على جوهرها .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	يمكن ايجاز مخرجات العلم لمادة اللغة العربية العامة لاقسام غير الاختصاص بالنسبة لمرحلة الدراسة الأولى بالاتي :- 1 - سيتمكن الطالب من التعرف على خصائص اللغة العربية كلغة سامية ، وفهم الخصائص المشتركة للغات السامية ، ومكانة اللغة العربية ضمن هذه العائلة اللغوية مما يعزز من ادراكه لاصولها وتطورها عبر التاريخ . 2- تحليل أصوات اللغة العربية من حيث أماكن وطرق النطق ، والتمييز بين مختلف الأصوات العربية . 3- معالجة القضايا الصرفية وتحليل بنية الكلمات العربية ، وفهم كيفية تكوينها وتغييرها لأداء معان مختلفة مما يطور مهاراته في تكوين وصياغة الكلمات بشكل صحيح . 4- تحديد التراكيب النحوية في اللغة العربية واستخدامها بشكل سليم مما يعزز قدرته على بناء جمل صحيحة نحويًا ومعبرة بوضوح . 5- فهم العلاقات الدلالية مثل الترادف والتضاد والتضمن بين الكلمات مما يوسع من ادراكه لمعاني الكلمات ، وتوظيفها في سياقات مختلفة . 6- اتباع قواعد الاملاء الصحيحة وتطبيقها مما يساهم في تحسين كتابته ويضمن وضوح المعنى ، ودقته . 7- تحليل الأنواع الأدبية وتوظيف البلاغة في التعبير مما يعزز من فهمها للنصوص الأدبية ويطور مهارته في الكتابة بأسلوب مؤثر وبلاغي.
Indicative Contents المحتويات الإرشادية	1- مقدمة حول اللغة العربية كجزء من اللغات السامية • التعريف باللغة العربية واصولها واهم خصائصها . • مكانة اللغة العربية ضمن عائلة اللغات السامية وتاريخ تطورها . • دراسة خصائص اللغة العربية المتأصلة في جذورها السامية . 2- أصوات اللغة العربية : النطق والأداء • مقدمة في علم الصوتيات واهمية الفهم الدقيق لاصوات اللغة . • تقسيم الأصوات حسب أماكن النطق : الأصوات الحلقية ، الشفوية ، اللثوية وغيرها . • دراسة طرق النطق المختلفة (مثل : الانفجار والاحتكاك) والتطبيقات العلمية للنطق الصحيح 3- التحليل الصرفي للكلمات العربية .

	• شرح أساسي لبنية الكلمة في اللغة العربية وأهمية الصرف في بناء المعنى . • دراسة أنواع الكلمات من حيث البناء مثل الأفعال والأسماء والمشتقات . • كيفية تكوين الجذور والأوزان وفهم الصيغ الصرفية المستخدمة في اللغة العربية . • دراسة أساسيات النحو العربي وقواعد الجملة العربية . • التعرف على تراكيب الجملة الفعلية والاسمية والمركبة . • تطبيقات على تركيب الجمل وتصحيح الأخطاء النحوية الشائعة . • العلاقات الدلالية بين المفردات . • التعريف بالدلالات المختلفة للكلمات والعلاقات بينها مثل الترادف والتضاد • فهم معاني الكلمات في السياقات المختلفة وتوضيح كيفية تداول المعاني . • دراسة المصطلحات اللغوية المختلفة وطرق استخدامها لتحقيق الدقة في التعبير . • قواعد الإملاء الصحيحة . • أهمية الإملاء في تحسين جودة الكتابة وضمان وضوح المعنى . • دراسة القواعد الأساسية للإملاء ، مثل قواعد الهمزة والالف المقصورة والممدودة . • تدريبات على كتابة القواعد الإملائية بشكل صحيح ؛ لتجنب الأخطاء الكتابية الشائعة . • الأدب العربي والبلاغة ، التعرف على الأنواع الأدبية الأساسية مثل : الشعر والنثر والمقالة والقصة . • دراسة الأساليب البلاغية في الأدب العربي، وأهم أدوات البلاغة مثل التشبيه والاستعارة والمجاز والكناية . • تحليل النصوص الأدبية ، وتوظيف البلاغة في الكتابة لزيادة التأثير والقوة في التعبير .
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	ليحقق التدريسي أهداف ونواتج التعلم المستهدفة لا بد من تحقيق الآتي : ١_ التركيز على استراتيجيات تقود الى التعلم النشط ، والتأكيد على دور المتعلم وإثارة اهتمامه ودفعه الى المشاركة الإيجابية ٢_ الاكثار من النصوص العربية العالية ٣_ وان نعد بعض القطع للقراءة يمتزج فيها درس القواعد بدرس الأدب؛ فان ذلك ادعى لتنمية ذوق الطالب في الفهم والحس والكلمات والأساليب واستعمالها . ٤_ منح التدريسي حرية اختيار قطع للقراءة من كتب الأدب والنصوص ومن ادب المناسبات الذي ينشر في الصحف والمجلات ، لتصحيح النطق عند الطالب ، وتعويد على القراءة الصحيحة الخالية من اللحن . ٥_ تقع على عاتق التدريسي مهنة اساسية وهي التشويق والتقويم والتصويب في تدريسه اللغة_ العربية العامة لأقسام غير اختصاص . ٦_ تنشيط عنصر الاعتزاز باللغة العربية لدى طالب العلم وتأصيله والعمل على زرع محبته للغة العربية بوصفها اللغة الام لغة القرآن الكريم لغة الاعجاز والبيان . من خلال عرضه لقصص تراثية تتعلق بحرص العربي على لغته والاعتزاز بها .

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	4	20% (5)	3 , 6,8,11	LO #1...#3, #4...#6, #7&#8, #9... #11
	Assignments	2	10% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	(الفصل الأول) التعبير القرآني): نص قرآني محدد من سورة الكهف (قصة موسى والخضر عليهم السلام) من الآية رقم "60" الى الآية رقم "82" .
Week 2	المهارات اللغوية : (1) الحروف الشمسية والقمرية .
Week 3	(3) كتابة حرفي الضاد والظاء .
Week 4	(4) كتابة التاء المربوطة والطويلة .
Week 5	(5) علامات الترقيم .
Week 6	(الفصل الثاني) الأصوات والمعجم العربي : (6) الأصوات العربية : الأصوات الصامتة والصائتة .
Week 7	(7) أنواع المعاجم (معجمات الألفاظ و معجمات المعاني) و طريقة استخراج الألفاظ من المعجم .
Week 8	(الفصل الثالث) القواعد النحوية : (8) أنواع الكلم (الاسم ، و الفعل ، و الحرف) .
Week 9	(9) المفرد ، و المثني ، و الجمع ، و علامات إعرابها .

Week 10	(10) الجملة الفعلية و الجملة الاسمية .
Week 11	(11) من الأدوات النحوية : أدوات الجر ، أدوات نصب الفعل المضارع ، أدوات جزم الفعل المضارع .
Week 12	(الفصل الرابع) البلاغة و الأدب : (12) من الفنون البلاغية : التشبيه .
Week 13	(13) نصوص من (الشعر الجاهلي = امرئ القيس) ، و (الإسلامي = حسان بن ثابت) .
Week 14	(14) نصوص من (الشعر العباسي = المتنبي) ، و (الأندلسي = الموشحات) .
Week 15	(15) نصوص نثرية عربية قديمة (الخطب ، و الوصايا ، و المقامات) .

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

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- التعبير القرآني - تأليف الدكتور فاضل السامرائي 2- اللغة العربية العامة لأقسام غير الاختصاص / تأليف مجموعة من أساتذة اللغة العربية. 3- شذا العرف في فن الصرف - تأليف الدكتور احمد الحملاوي 4- البلاغة الواضحة ١- تأليف الدكتور احمد مطلوب	
Recommended Texts		
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 (فيد 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	Mathematics		Module Delivery
Module Type	Support		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-1106		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Suhad Kareem Hamid		e-mail suhadkareem@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Teaching the student functions and the concept of continuity for functions and inequalities, as well as derivation, methods of integration and operations on them, and how to use them in various scientific subjects and harness them to solve mathematical problems that they face in various scientific subjects. Teaching and educating students on all the necessary and necessary information related to mathematics, which qualifies them to model scientific concepts into mathematical equations..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals A1- Enabling students to obtain knowledge and understanding of modern mathematics A2- Enable students to obtain knowledge and understanding of the structure of functions and equations, test their properties, and perform integrations and differentials on them. A3- Enabling students to obtain knowledge and understanding of mathematical integrations and differentials of functions. A4- Enabling students to obtain knowledge and understanding of numerical analysis methods and types of equations B - The soft skills objectives of the course B1 - the skill of knowing - remembering B2 - Memory and analysis skills B3 - Use and modeling skills
Indicative Contents المحتويات الإرشادية	Subtraction-minus, greater than, take away, fewer than, less than, subtract, decreased by. Multiplication-product, multiply, multiplied by, times. Division-quotient, dividend, divide, divided by, each, per, average, divided equally. Equal-the same, equals, the same as, equivalent, is equal to.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	
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	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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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	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Limits and continuity ,Estimating limits from graphs, Estimating limits from tables Formal definition of limits (epsilon-delta),Properties of limits,Limits by direct substitution, Limits using algebraic manipulation, Strategy in finding limit
Week 2	Continuity at a point, Continuity over an interval, Removing discontinuities, Infinite limits , Limits at infinity, Intermediate value theorem
Week 3	Derivatives: definition and basic rules, Estimating derivatives, definition and basic rules Differentiability, definition and basic rules, Power rule, chain rule and other More chain rule practice,chain rule and other advanced topic
Week 4	Implicit differentiation, Implicit differentiation (advanced examples), Differentiating inverse functions, Derivatives of inverse trigonometric function
Week 5	Second derivatives, Disguised derivatives, Logarithmic differentiation, exponentials differentiation
Week 6	Applications of derivatives,Approximation with local linearity, Applications of derivatives L'Hôpital's rule, L'Hôpital's rule, composite exponential functions
Week 7	Integrals ,Indefinite integrals of common functions, Integrals .Definite integrals of common Integrating with u-substitution,
Week 8	Midterm Exam
Week 9	Integrating using long division and completing the squares Integrating using trigonometric identities

Week 10	Integration of rational function, Integration by parts, Integration by fraction partition
Week 11	Sequences, Series and the integral test, Comparison tests
Week 12	Alternating Series, absolute convergence, ratio and root tests
Week 13	Strategy for testing series, Power series, representations of functions as power series
Week 14	Taylor and Maclaurin series
Week 15	Applications of Taylor polynomials
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<i>Foundations of the Calculus</i> , DeBaggis, Henry F.; Miller, Kenneth S. (1966) Differential and Integral Calculus, Philip Franklin .	Yes
Recommended	Limits and Continuity, Teddy C. J. Leavitt	No

Texts		
Websites	https://www.cuemath.com/calculus/	

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.				

Level One

Semester Two

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Volumetric Analytical Chemistry		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-1217		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	2
Administering Department	Chemistry	College	College of Science
Module Leader	Ekhlas Ahmed Abdulkareem	e-mail	ekhlasahmed@uodiyala.edu.i
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Msc
Module Tutor	Name (if available)	e-mail	ekhlasahmed@uodiyala.edu.i
Peer Reviewer Name	Ekhlas Ahmed Abdulkareem	e-mail	Khloosa123aa@gmail.com
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Throughout this course, we will focus on the following learning objectives: 1. Understand the fundamental concepts of chemical equilibrium 2. Parameterize solution behavior and calculate solution concentrations given the appropriate equilibrium constants 3. Apply knowledge of equilibrium constraints to a range of systems of interest including solubility, acid/base chemistry, complex formation, oxidation/reduction, hydrolysis, and phase partitioning. 4. Investigate solution behavior using electrochemical methods, including potentiometry, voltammetry, and ion selective electrodes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this learning unit, the student is able to : This course aims to extend the fundamental formation of 'Analytical Chemistry I' to current instrumental analysis methods. The philosophy and strategy of this programme are identical to those described in . This course not only provides excellent practice in analytical techniques, but also allows the rigorous development of experimental schemes and analysis methods, relying on physical chemistry and analytical reasoning. The objectives of the practical exercises are the following : - To help the understanding of the course - To familiarize the students with the theory-experience relationship - To train the students in a professional practice in a chemistry laboratory - To instil a sense of initiative towards practical processes in the students
Indicative Contents المحتويات الإرشادية	Class Molecular absorption spectroscopy, atomic spectrometry and voltamperometric methods: equipment, performances and applications. Electrolysis-based analysis methods: analytical applications.

	Acid-base reactions in non-aqueous media: solvent types and pH calculations. Practical aspects of chromatography in liquid and gas phases. Exercises Analysis of samples where application of most of the techniques covered during the course is required. A complete analysis of a 'real' sample will be encouraged, for which the well-thought-out use of titrimetric and instrumental methods is necessary in order to determine the concentration of several ions of a solution. This process will allow the students: (i) to develop and discuss schemes and analysis methods with rigorous analytical reasoning. (ii) to obtain professional laboratory experience of current techniques.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem)	106	Unstructured SWL (h/w)	7

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Volumetric Analysis, Classification and General Aspect for Volumetric Titrimetry
Week 2	Expressing the concentration of standard solutions
Week 3	Volumetric Calculations Using Molraity and calculations
Week 4	Volumetric Calculations Using Normality and calculations
Week 5	Titer (T) and calculations
Week 6	Back-titration and calculations

Week 7	Neutralization Titration and classifications
Week 8	Midterm Exam
Week 9	Theory of Neutralization Titrations of Simple Systems
Week 10	Type of Neutralization Titrations
Week 11	Titration curves
Week 12	Titration Curve for Strong Base vs. Strong Acid with calculations
Week 13	Oxidation and reduction and what oxidizing and reducing agents
Week 14	Evidence of oxidation and reduction And their types
Week 15	oxidizing and reducing agents types and applications
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to quantitative analysis
Week 2	Lab 2: Methods of expressing the concentrations of solutions in analysis and quantitative calculations related to volumetric analysis
Week 3	Lab 3: preparation of (0.1N) HCL solution and sandardization wih sodium carbonate
Week 4	Lab 4: preparation of (0.1N) NaOHL solution and sandardization it with (0.1N)HCL
Week 5	Lab 5: first exam
Week 6	Lab 6: Determintion of hardness of water
Week 7	Lab 7: preparation and sandardization of (0.1N)KMnO ₄
Week 8	Standardization of permanganate solution with oxalate ion
Week 9	Unknown solution: Practical exam.
Week 10	Determination the concentration of ferrous ion.
Week 11	Unknown solution: Practical exam.

Week 12	Complexometric titration, Determination of total hardness (permanent and temporary) of water
Week 13	Unknown solution: Practical exam.
Week 14	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Inorganic Chemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-1218		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Jinan Mohammed Mahmoud	e-mail	jinan.mohammed@uodiyala.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	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Prepare a generation equipped with a solid foundation in general and inorganic chemistry, both in theoretical and practical contexts. Given the vital role of chemistry in all aspects of life, graduates will be capable of understanding the country's developmental needs and meeting the demands of the labor market across public institutions and the industrial sector. 2. Promote awareness and advancement in chemical sciences by producing qualified researchers and academic professionals who can adapt to rapid scientific and technological developments. Graduates will possess the skills necessary to operate laboratory equipment, synthesize novel compounds, and apply diverse analytical techniques relevant to pharmaceutical and industrial fields. 3. Make meaningful contributions to strengthening the university's engagement with the community by offering expert consultations, as well as by training and developing academic and administrative staff to serve societal needs. 4. Encourage outstanding students in the Chemistry Department to participate as teaching assistants, supporting their academic growth and preparing them for future roles as members of the teaching faculty.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals 1- Enable students to obtain knowledge and understanding of inorganic chemistry. 2- Enable students to obtain knowledge and understanding of the chemical elements in the periodic table. 3- Enable students to obtain knowledge and understanding of the chemical structures of inorganic compounds. 4- Enable students to obtain knowledge and understanding of reactions in inorganic chemistry. 5- Enable students to obtain knowledge and understanding of practical experiments in inorganic chemistry. B - The soft skills objectives of the course 1 - knowledge skills - remembering. 2 - application and analysis skills. 3 - Use and development skills. 4- evaluation and creativity skills.

Indicative Contents المحتويات الإرشادية	This semester focuses on the study of atomic structure and the electronic configuration of elements, along with their arrangement in the periodic table according to groups and periods. The course covers the rules and regulations governing the allowed orbitals for electron placement in the main shells. It also explores the periodic properties of elements. Additionally, the course addresses the atomic states (term symbols) of elements to facilitate investigation into the properties and crystal structures of ionic compounds.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Ionic compounds , Lattice energy, Born- Haber Cycle, Polarizations and Covalency.
Week 2	Fajan's Rules in polarization , Hydration of Ions or Solubility of ionic compound.
Week 3	Structure of metal crystals.
Week 4	Covalent compounds and bonding theories : Lewis Structures.
Week 5	Examples and solutions.
Week 6	Assigning Formal Charge on Atoms in compounds, Resonance structure.
Week 7	Valence bond theory (VBT) : Orbital Hybridization
Week 8	Midterm Exam
Week 9	Examples and solutions.
Week 10	Valence shell electron pair repulsion (VSEPR) theory

Week 11	Examples and solutions.
Week 12	Molecular Orbital Theory (MOT)
Week 13	Hydrogen : The group1 elements : the alkali metals ,
Week 14	The group2 elements : the alkaline earth metals
Week 15	Hydrogen : The group13 elements , The group14 elements
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	الكيمياء اللاعضوية ، تأليف الدكتور ثناء جعفر محمد الحسني ، 1989	Yes
Recommended Texts	Inorganic Chemistry principles of structure and reactivity 4th ed, by James E. Huhhey et al, Harper Collins college Puplishers (1993) Inorganic Chemistry, 5th Edition; Gary. L. Miessler and	No

	Donald . A. Tarr (2014).	
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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.				



الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Human Rights and Democracy		Module Delivery
Module Type	Basic learning activities		☒ Theory ☒ Lecture ☐ Lab ☐ L Tutorial ☐ Practical ☐ Seminar
Module Code	UD04		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level		Semester of Delivery	
Administering Department	جميع اقسام الكلية	College	College of Engineering
Module Leader		e-mail	
Module Leader's Acad. Title	لجنة حقوق الانسان والديمقراطية	Module Leader's Qualification	MSc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	12/06/2023	Version Number	1.0

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



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. يتعلم الطالب خلال السنة الدراسية أساسيات حقوق الإنسان والديمقراطية ما حقوقه كيف يدافع عنها بالطرق القانونية وماهي ضماناتها الداخلية والدولية. 2. استحصا المعرفة في مجال الديمقراطية وأنواع أنظمتها واثرا على حقوق الانسان . 3. تنمية شخصية الطالب وتعزيز وعيهم في الأنظمة السياسية الديمقراطية وتفاصيلها وكيفية تطبيقها على ارض الواقع واهمية ان يكون فعال في المجتمع من خلال احترامه لحقوق الآخرين ومعرفة ان الحقوق والحريات تنتهي عند بداية حقوقهم وحرياتهم ويؤدي واجباته بدلا من اكتساب الحقوق فقط. 4. تعزيز ثقافة السلام القائمة على العدل والمساواة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. تمكين الطالب من معرفة اساسيات الدفاع عن حقوقه وحقوق الآخرين بعد معرفتها ومعرفة أهميتها له وللمجتمع بصورة عامة وأيضا معرفه كل شخص حدود حقوقه وحريته . 2. تمكين الطالب في المشاركة السياسية وذلك من خلال معرفته بأهمية مشاركته في الانتخابات وتأثير هذه المشاركة على سير الانتخابات وتشكيل السلطة فيما بعد. 3. معرفة الطالب ضمانات حقوقه وحرياته وماهي مصادرها. 4. معرفة الفرق بين الحقوق والحريات. 5. تمكين الطالب من معرفة ماهي المفهوم العلمي للديمقراطية وماهي جذورها وانواعها واشكالها. 6. يتعلم الطالب كيف يؤثر النظام الديمقراطي على حقوق الانسان وماهي العلاقة بينها. 7. ادراك الطالب ضرورة ان يكون مواطن فعال في المجتمع ايضا معرفه شروط الناخب وشروط المرشح للانتخابات. 8. معرفة أنظمة الانتخابات وايهما افضل. 9. فهم الطالب للقانون الدولي لحقوق الانسان وايضا معرفة مختصرة عن المنظمات الدولية والية عملها كالأمم المتحدة ومنظمة الصليب الأحمر وغيرها.
Indicative Contents المحتويات الإرشادية	الجزء الأول - تعريف حقوق الانسان وحقوق الانسان في الحضارات القديمة (تعريف الحق وتعريف الانسان ومعرفة أهمية حقوق الانسان بالنسبة للإنسان والمجتمع أيضا دراسة حقوق الانسان في الحضارات كالحضارة المصرية والعراقية واليونانية والرومانية) (٤ ساعات) الجزء الثاني معرف حقوق الانسان في الأديان السماوية واهمها الإسلام (٢ ساعة) مصادر حقوق الانسان تتضمن (مصادر دولية كالإعلان العالمي لحقوق الانسان والعهدان الدوليان والمصادر الإقليمية التي تشمل الاتفاقيات الإقليمية كالاتفاقية الأوروبية والأمريكية والدستور) (٢ ساعة) ضمانات حقوق الانسان (كالضمانات الدستورية والقانونية) (٢ ساعة) الاتفاقيات الدولية والإقليمية لحقوق الانسان (٢ ساعة) الحريات العامة وانواعها والمقارنة فيما بينها (٢ ساعة) مستقبل حقوق الانسان والعولمة وحقوق الانسان (٢ ساعة) تعريف وتاريخ وأنواع الديمقراطية (دراسة تعريف ونشأة وتطور الديمقراطية مبادئها وانواعها كالديمقراطية المباشرة وغير المباشرة والنظام الرئاسي والبرلماني) (٦ ساعات) تعريف الانتخاب وشروطه وأنواع النظم الانتخابية وتعريف المجلس النيابي (٦ ساعات) العلاقة بين الديمقراطية وحقوق الانسان (٢ ساعة)



Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. زيادة وعي الطالب بأهمية معرفته حقوقه وواجباته اتجاه المجتمع وعلاقة حقوق الانسان بالنظام الديمقراطي
	2. ثقافة عامة في مجموعة من المجالات ومنها المجال القانوني و السياسي والاجتماعي ورفع ثقة الطالب بنفسه من خلال ربط المادة النظرية بالواقع العملي

Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	15% (10)	5 and 10	LO #1, #2 #3, and #6 #7#8
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	15% (10)	13	LO #5, #8 and #9
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	محاضرة تعريفية عن المادة واهميتها ..
Week 2	تعريف الحق والانسان وحقوق الانسان واهمية حقوق الانسان ,حقوق الانسان في الدين الإسلامي والحضارات القديمة.
Week 3	مصادر حقوق الانسان الدولية والإقليمية والمحلية.
Week 4	ضمانات حقوق الانسان الدستورية والقانونية وضمانات حقوق الانسان على الصعيد الدولي.
Week5	ضمانات حقوق الانسان في الإسلام
Week 6	دور المنظمات الإقليمية في حماية حقوق الانسان.
Week 7	خصائص حقوق الانسان وتعريف الحريات العامة وانواعه والمقارنة بينها وبين الحقوق القانون الدولي لحقوق الانسان والقانون الدولي الإنساني ومنظمة الصليب الأحمر.
Week 8	مستقبل حقوق الانسان وسبل تطويرها .
Week 9	العولمة وحقوق الانسان .
Week 10	تعريف الديمقراطية وتطورها التاريخي ومبادئها . الديمقراطية بين العالمية والخصوصية . اشكال الديمقراطية / الديمقراطية المباشرة.
Week 11	الديمقراطية شبه المباشرة والديمقراطية التمثيلية / اركان النظام التمثيلي / اشكال النظام التمثيلي.
Week 12	المجلس النيابي وانواعه / الانتخاب وشروطه / هيئة الناخبين.
Week 13	تنظيم عملية الانتخاب / تحديد الدوائر الانتخابية / القوائم الانتخابية / المرشحون/ الحملة الانتخابية / التصويت .
Week 14	نظم الانتخابات.
Week 15	علاقة الديمقراطية بحقوق الانسان وكيفية التأثير والتأثر فيما بينها.
Week 16	الامتحان النهائي



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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان والطفل والديمقراطية / تأليف ماهر صالح علاوي ورياض عزيز هادي وعلي عبد الرزاق محمد واخرون / العاتك / بيروت / ٢٠٠٩	نعم
Recommended Texts	عباس الدليمي / حقوق الانسان الفكر والممارسة فخري رشيد، صلاح ياسين / المنظمات الدولية / العاتك لصناعة الكتاب / بغداد عصام العطية / القانون الدولي العام / المكتبة القانونية / بغداد/2012	لا
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	Cytology		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-12010		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	2
Administering Department	Chem	College	CoS
Module Leader	Najwa Jameel Hameed	e-mail	dr.najwajameel@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Preparing specialists who are familiar with the basics of cytology, theoretically and practically, who are able to meet the needs of the labor market, in addition to teaching cytology to students of other departments in the Faculty of Science and some other faculties at the university. Conducting scientific research and trying to keep pace with the scientific development of cytology. Cooperating with state institutions and the private sector by providing advice and scientific advice and conducting cytology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to gain knowledge and understanding of the intellectual framework of cytology, enable students to acquire knowledge and understanding of international cytology standards, enable students to acquire knowledge and understanding of the laws of cytology ,enable students to acquire knowledge and understanding of cytolog analysis standards, enabling students to obtain knowledge and understanding of the law of the wrong use of cytological . skills goals special to the programme scientific skills , reminding and analyzing skills and uses , development skills .
Indicative Contents المحتويات الإرشادية	Biochemistry and cell membranes, Application of biochemistry , Biomolecules, cell membrane and cell wall contents , Plasma membranes , Endocytosis , Exocytosis , Alkaline buffer solutions ,

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Clarification and explanation of the study materials by the academic staff through the blackboard, smart board and computer. Providing students with knowledge through homework assignments for academic vocabulary Asking students to visit the library to obtain additional knowledge of the study materials .Improving students' skills by visiting websites to obtain additional knowledge of the study subjects .
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Biochemistry and cell membranes Application of biochemistry

Week 2	Biomolecules, cell membrane and cell wall contents
Week 3	Cellular transport across cell membranes , mechanisms of transfer materials through cell membranes
Week 4	Active transport, passive transport, carrier proteins
Week 5	proteins channels transport , potassium channels , Sodium potassium pump
Week 6	Endoplasmic reticulum, Golgi apparatus
Week 7	Plasma membranes
Week 8	Midterm Exam
Week 9	Endocytosis , Exocytosis
Week 10	Function of water in the body and cell , the solubility of compounds in water, buffer solutions
Week 11	Principal of buffering, acidic buffer solutions , adding acid or base to this buffer
Week 12	Alkaline buffer solutions , adding acid or base to this buffer
Week 13	Calculations involving buffer solutions, acidic buffer solutions ,
Week 14	alkaline buffer solutions
Week 15	Blood buffer
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Biochemistry and cell membrane ,Application to Biochemistry , Biomolecules, Cell membrane, Content of cell wall
Week 2	Cellular activities, Transport Across cell Membrane, Mechanism of transfer of materials through cell membrane
Week 3	Active transport, Passive transport, Carrier Protein, Channel Protein , Channel Protein Transport ,Potassium Channels, Sodium Potassium Pump
Week 4	Endoplasmic Reticulum Golgi apparatus , Plasma Membrane
Week 5	Endocytosis ,Exocytosis , The function of water in the body and cell, the solubility of

	compounds in water, Buffer solutions
Week 6	Principle of buffering, Acidic buffer solutions adding an acid to this buffer solution, adding an alkali to this buffer solution
Week 7	Alkaline buffer solutions, adding an acid to this buffer solution , adding an alkali to this buffer solution, Calculations Involving Buffer Solutions, Acidic Buffer Solutions, Alkaline Buffer Solutions , Buffer Solution in Blood
Week 8	Non-Living Cellular Components1
Week 9	Non-Living Cellular Components1
Week 10	Cell Shape and Size
Week 11	Cell Cycle- Cell Division-Mitosis
Week 12	Cell Cycle- Cell Division-Meiosis
Week 13	Cytogenetics
Week 14	Plant Cytogenetics
Week 15	Human and Cancer cytogenetic
Week 16	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Essentials of Medical Biochemistry by N.V Bhagavan & Chung Eun-Ha 2- Lehninger Principles of Biochemistry by David L. Nelson & Michael M. Cox	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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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.



الملحق ٤: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer I		Module Delivery
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ L Tutorial ☒ Practical ☐ Seminar
Module Code	UD13		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGI	Semester (s) offered	
Administering Department	All Department	College	All College of The University
Module Leader	Dr. Ali N. Albu-Rghaif	e-mail	ali.alburghaif@uodiyala.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	PhD
Module Tutor	Dr. Bashar Talib AL-Nuaimi	e-mail	alnuaimi_bashar@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	19/10/2024	Version Number	1.0

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



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Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر	
Module Aims أهداف المادة الدراسية	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. 4. Providing students with a way to use other modern technologies related to the educational process.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will be able to describe the basic concepts functions and primary components of a computer. 2. Students will demonstrate the ability to set up a personal computer. 3. Students will be able to describe the function of an operating system and differentiate between various types. 4. Students will understand and utilize basic GUI elements such as windows, icons, and menus. 5. Students will apply Microsoft Office (Word, Excel, PowerPoint) features. 6. Students will understand how the internet works and effectively use web browsers to search for information. 7. Students will compose and manage emails professionally, including understanding attachments, signatures, and managing contacts. 8. Students will identify and resolve common computer issues related to hardware, and software.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Course Introduction to Computer, Computer Components, and Personal Computer. 2. Working with Operating Systems and Graphical User Interface (GUI). 3. Microsoft Office Word, Excel, and PowerPoint. 4. Working with the Internet and Web browser 5. Working with E-mail and Computer troubleshooting
Course Description	Introduction to Computer: Concepts of Hardware and Software with their components; Concept of Computing, Data and Information; Applications of Information Electronics and Communication Technology (IECT); Connecting input/output devices, and peripherals to CPU. Computer Components: Computer Portions, Hardware Parts, I/O Units, Memory Types, Basic CPU Components, Computer Ports, Personal Computer, Personal Computer (Features and Types). Operating System and Graphical User Interface (GUI): Operating System; Basics of



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	Common Operating Systems; The User Interface, Using Mouse Techniques; Use of Common Icons, Status Bar, Using Menu and Menu-selection, Concept of Folders and Directories, Opening and closing of different Windows; Creating Shortcuts. Word Processing: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting, and thesaurus; Printing of word document. Spreadsheet: Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spreadsheet, printing of Spreadsheet. Presentation Software: Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation/handouts. Introduction to Internet and Web Browsers: Computer networks Basic; LAN, WAN; Concept of Internet and its Applications; Connecting to Internet; World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address. Communications and Emails: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using emails for document collaboration. Computer Troubleshooting: Identifying and solving common hardware and software problems; Basic troubleshooting techniques and tools for diagnosing and resolving issues.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• In this course, students are guided by: • Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do practical work. • Encourage students to work in groups.



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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	0.8
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% (5)	6 and 12	All
	Assignments	2	10% (5)	2 and 13	LO #1 to #8
	Projects / Lab.	1	10% (10)	Continuous	All
	Group Work	2	10% (5)	13	LO #2, #4 and #6
Summative assessment	Midterm Exam	1hr	10% (10)	9	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Computer
Week 2	Computer Components
Week 3	Personal Computer
Week 4	Operating Systems
Week 5	Graphical User Interface (GUI)
Week 6	Microsoft Office- Word Introduction
Week 7	Microsoft Office- Word Practice
Week 8	Microsoft Office- Excel Introduction
Week 9	Microsoft Office- Excel Practice
Week 10	Microsoft Office- Power-Point Introduction
Week 11	Microsoft Office- Power-Point Practice
Week 12	Introduction to Internet
Week 13	Web Browser
Week 14	Communications and E-mail
Week 15	Computer Troubleshooting

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to the lab and get started with use of computer
Week 2	Computer Components: Computer Portions, Hardware Parts, I/O Units, Memory Types, Basic CPU Components, Computer Ports,
Week 3	Personal Computer (Features and Types).
Week 4	Basic use of Windows operating system
Week 5	Graphical User Interface (GUI): The User Interface, Using Mouse Techniques; Use of Common Icons, Status Bar, Using Menu and Menu-selection.
Week 6	Microsoft Office Word: Getting Started with Word



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Week 7	Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs, Adding Tables and Inserting Graphic Objects, Controlling Page Appearance and Proofing a Document.
Week 8	Microsoft Office Excel: Getting Started with Excel
Week 9	Microsoft Office Excel: Sorting, Selecting and Subtotaling data, Microsoft Office Excel: Formulas and Functions, Worksheet Formatting and Presentation
Week 10	Microsoft Office PowerPoint: Getting Started with PowerPoint
Week 11	Microsoft Office PowerPoint: Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation, Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation, Prepare to deliver your presentation
Week 12	Introduction to Internet: Computer networks Basic; LAN, WAN; Concept of the Internet and its Applications; Connecting to the Internet;
Week 13	Learn Web Browsers: World Wide Web; Web Browsing software, Search Engines; Understanding URL; Domain name; IP Address.
Week 14	Communications and Emails: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using emails for document collaboration.
Week 15	Computer Troubleshooting: Identifying and solving common hardware and software problems; Basic troubleshooting techniques and tools for diagnosing and resolving issues.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Joan Lambert and Steve Lambert, Windows 10 step by step, 1st Edition 2015. - Joan Lambert and Curtis Frye, Microsoft Office 2016 step by step, 1st Edition 2015.	Yes
Recommended Texts	- Michael Miller, ABSOLUTE BEGINNER'S GUIDE TO COMPUTER BASICS, 5th EDITION, QUE Indianapolis, Indiana 46240, 2010. - Paul McFedries, TEACH YOURSELF VISUALLY MICROSOFT WINDOWS 10, ANNIVERSARY	
Websites	Microsoft Help, https://support.microsoft.com/en-us/products Learn Microsoft Office, https://www.goskills.com/Microsoft-Office	



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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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB 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	English Language 1		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UD11			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGI	Semester of Delivery		
Administering Department	All	College	All	
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	Name(if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	3/11/2024		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

Module Objectives أهداف المادة الدراسية	The module aims at enabling students to learn and understand the written and spoken form of English. It also aims at teaching functional English to learners and improving their reading, writing and listening skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Read and understand simple texts in English. 2. Answer simple comprehension questions and match sentences about texts. 3. Reconstruct texts by reordering sentences. 4. Understand the main idea of a text. 5. Identify specific information in a text. Writing and paraphrasing paragraphs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. i) Grammar has a core place in language teaching and learning. ii) A wide variety of practice tasks in all the four skills are essential to language learning. iii) Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational or idiomatic.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Headway's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills with communicative role-plays and personalization. Authentic material from a variety of sources enables students to see new language in context, and a range of comprehension tasks, language and vocabulary exercises, and extension activities practice the four skills. 'Everyday English' and 'Spoken grammar' sections practice real-world speaking skills, and a writing section for each unit at the back of the book provides models for students to analyze and imitate.
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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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	4	20% (5)	3 , 5,8,11	LO #1...#3, #4...#5, #7&#8, #9... #11
	Assignments	2	10% (5)	5 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered				
Week 1	Course Introduction (Course material and objectives, learning outcomes, lessons and assessment discussed with the learners).				
Week 2	Unit 1. Hello Vocabulary: People, introduce each other – ways of greetings, Numbers 1-10 and plurals. Reading: Introduction dialogues, Everyday English dialogues. Listening: People meet each other and introduce someone else. How are you? What's this in English? Speaking: Introductions, Good morning! Practicing introduction dialogues- Information gap. Writing: Complete the conversations. Grammar: Verb to be with subject, Possessive adjectives, This is				
Week 3	Unit 2. Your World Vocabulary: A set of cities and countries: Brazil, Spain.... , Adjectives: awful, really good, fantastic, Nouns: center, hospital, building, park. Numbers 10-20 Reading: Two people are on holiday in New York. Listening: listening to a conversation about Claude and Holly. Speaking: Talking about where people are from. Writing: Complete the conversations, countries , cities, adjectives, nouns, and numbers. Grammar: Subject verb agreement, possessive pronouns, questions (what, where ... ?).				
Week 4	Unit 3. All About You Vocabulary: Jobs (police officer, nurse..), Personal information (surname, first name, address.....). Reading: ' Hello! We're on A Mountain' about different students from different countries. Listening: Interview on a mountain. Speaking: Practice the interview. Writing: Social expressions (I am sorry, that's ok) Grammar: Subject pronoun (negatives and questions) , Possessive adjectives.				
Week 5	Unit 4. Family and friends Vocabulary: Family members (mother, son,....) , Describing friend (very clever , funny,...), Alphabet. Reading: 'The Walk' An Interview with students on a walk.				

	Listening: Listen and identify the people 'Fatima Al Zamil' , 'Paddy McNab and his family' Speaking: Talking about family and friends. Writing: Write about a good friend , his/ her family , job, favourite shop, and sport , extra.... . Grammar: Possessive adjectives. Possessive 's. Has/ have Adjective + noun Irregular Plurals.
Week 6	Assessment Test 1. Feedback and Remedial Work
Week 7	Unit 5. The way I live? Vocabulary: The lexical set of sports/food/drinks. Verbs (live, work), Languages and nationalities. Reading: ' Colin Brodie from Dundee' Listening: Listen to the context of likes and dislikes. At a party: Flavia and Terry are at a party in London, At dinner : two people meet and talk. Speaking: Role play: Practice the conversation in different situations. Writing: Write sentences, questions, make notes. Grammar: Present Simple :(I/you/we/they),Indefinite article(a/an),Adjective + noun(a German car).
Week 8	Unit 6. Everyday Vocabulary: The time, Words that go together: watch TV, get up early, Days of week. Reading: 'Lois Maddox ' Talking about daily routines. Listening: Lifestyle questionnaire, Listening a phone conversation between Lois and Elliot. Speaking: Asking and answering questions about daily routines. Writing: Write the correct preposition, Complete the questions. Grammar: Present Simple: He/she Question and negatives, Adverbs of frequency Prepositions of time.
Week 9	Unit 7. My Favourites Vocabulary: Adjectives: lovely, terrible, comfortable, friendly..., Opposite adjectives: new/old, big/small Places: chemist, post office Reading: ' The Famous International Footballer' , An email of San Francisco, Listening: Listening the requests with Can I.....? A holiday postcard. Describing lifestyles, preferences and places Speaking: Role play: conversations in town. Writing: Writing an email to a friend. Grammar: Question words, Subject pronouns, Object pronouns, Possessive pronouns.
Week 10	Unit 8. Where I live Vocabulary: Rooms and furniture: living room, bedroom, In and out of town: beach, mountain, sailing,... Reading: 'Vancouver- a great city'. Listening: My home town, Steve talks about living in Vancouver, Listen to the directions. Speaking: Talking and asking about rooms and furniture, Giving directions to places. Writing: Write about a town you know. Grammar: There is /are , Prepositions: in, on, under, next to
Week 11	Assessment Test 2. Feedback and Remedial Work
Week 12	Unit 9. Times Past Vocabulary: Saying years, People and jobs, Irregular verbs Have, do, go: have lunch, do homework, go shopping Reading: 'Two Saudi boys find an antiquity vasa' Listening: 'Magalia Dromard' : Magalia talks about her family. Speaking: Telling a story form pictures. Writing: complete the sentences, write the words in correct form. Grammar: Was/were born , Past simple: irregular verbs (It's a Jackson Pollock).
Week 13	Unit 10. We had a great time! Vocabulary: Time expressions: on Monday, last night..., Sports and leisure: tennis, skiing, windsurfing... Play or go: play tennis, go skiing , Seasons: winter, summer... . Listening: 'Jack and Millie Parker's holiday', A couple talk about their holidays. Speaking: A questionnaire, Asking about holiday , My last holiday. Making conversations

	Writing: Write about your favourite holiday. Grammar: Past simple: regular and irregular, Questions/Negatives, Ago Dialogues with simple past.
Week 14	Unit 11. I can do that! Vocabulary: Verbs: (draw, run, drive), Verb+noun: (Listen to the radio, chat to friends), Adjective+noun (fast car, busy city, dangerous sport), Opposite adjectives: dangerous/ safe, old/modern. Reading: 'The Internet ' Listening: ' Five people talk about what they do on the internet ' Grammar: Can / can't, Adverbs, Adjective + noun, Requests and offers.
Week 15	Unit 12. Please and thank you Vocabulary: Shopping: (bread, milk, fruit) , Food: (cereal, salad, pasta, fish), In a restaurant: (menu, starter, desert, soup, salmon) Reading: People different parts of the world. Listening: 'Conversation with Adam' , 'After my exam'. Speaking: Describe what they eat? Discussion-what is a good diet? Grammar: I'd like, Some and Any , Like and would like.

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	New Headway Pre-Intermediate by: John and Liz Soars. Oxford University Press	Yes
Recommended Texts	None	
Websites	https://www.scribd.com/document/510746145/New-Headway-Plus-Beginner-Student-s-book	

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.				

Level Two

Semester Three

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Gravity Analytic Chemistry		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-23113		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	3
Administering Department	Chem	College	CoS
Module Leader	Marwah hashim Abdulateef	e-mail	marwahhashim@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	E-mail
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	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Learning students analytical chemistry fundamentals in specific knowledge of gravimetric analysis chemistry, classification of gravimetric analysis, precipitation analysis, types of precipitating reagents, inorganic precipitants and organic precipitants, properties of precipitant used for gravimetric analysis, calculation of gravimetric analysis, gravimetric factor, solubility of precipitates and Solubility product (K_{sp}), calculation the solubility from K_{sp}, solubility problems, The affected factors on the solubility of the precipitates, Contamination of the precipitates and its types , avoiding impurities, digestion of precipitates, washing solutions, drying and ignition of the precipitates, Statistic in analytical chemistry with examples. - Learning students, the fundamentals of analytical separation methods: classification of separation methods, masking agents, liquid-liquid extraction, solvent extraction fundamentals, separation and classification of chromatography, separation by ion exchanges. - Teaching and learning students all the subjects, that related to the analytical chemistry course, which allow them to be qualified working in different aspects of analytical chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to gain knowledge and understanding of the intellectual framework of analytical chemistry. Enable students to acquire knowledge and understanding of international chemical standards. Enable students to acquire knowledge and understanding of the laws of chemistry. Enable students to acquire knowledge and understanding of chemical analysis standards in gravimetric chemistry and separation methods. Enabling students to obtain knowledge and understanding of the law of the wrong use of chemicals.
Indicative Contents المحتويات الإرشادية	analytical chemistry fundamentals, gravimetric analysis chemistry, precipitation analysis, precipitating reagents, inorganic precipitants , organic precipitants, properties of precipitant, calculation of gravimetric analysis, gravimetric factor, solubility of precipitates ,Solubility product (K_{sp}), solubility problems, affected factors on the solubility of the precipitates, Contamination of the precipitates, impurities, digestion of precipitates, washing solutions, , Statistic in analytical chemistry.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for analytical chemistry. -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some practical problems..
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of analytical chemistry, fundamentals of gravimetric analysis, sampling and sampling treatment
Week 2	The steps of the gravimetric analysis, weight of a sample, solvent of a sample, precipitate of a sample, precipitant digestion, washing of a precipitant, precipitant burning, weight of a precipitant
Week 3	Classification of gravimetric analysis, precipitation analysis, pyrolysis analysis, isolation analysis, the qualities of good precipitants
Week 4	Types of precipitating reagents, inorganic precipitants, and organic precipitants properties of precipitant used for gravimetric analysis
Week 5	precipitating of homogenous solutions, types of homogenous solutions and its applications in gravimetric analysis, organic & inorganic precipitants, and their types & advantages with examples
Week 6	The chemical composition of the precipitates, calculation of gravimetric analysis, gravimetric factor, and examples
Week 7	Solubility of precipitates and Solubility product (Ksp), calculation the solubility from Ksp, solubility problems
Week 8	Midterm Exam

Week 9	The affected factors of the solubility: temperature, the physical and chemical nature of the solute, the nature of solvent, common ion effect, oxidation-reduction reactions effect
Week 10	ionic strength of the solution, the effect of pH, the complex formation, the hydrolysis effect, particle size effect of solute, examples, and problems
Week 11	Crystalline composition of the precipitates, their types & advantages with examples, and problems,
Week 12	Colloid composition of the precipitate and their types & advantages with examples, von-weimern for colloidal state
Week 13	Contamination of the precipitates, type of contamination, co-precipitation, post precipitation
Week 14	Treatment of the precipitates, avoiding impurities, digestion of precipitates,
Week 15	final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction and general idea of gravimetric analysis and the basic principles steps of gravimetric analysis ,gravimetric analysis methods ,Weight analysis steps ,Organic and inorganic precipitators and sediment solubility ,Precipitate contamination and its impact on the accuracy of results and treatment methods
Week 2	An experiment to determine the percentage of water of crystallization in aqueous salt
Week 3	An experiment to determine the percentage of water of crystallization in barium dichloride crystals
Week 4	Experimental estimation of elements by volatilization and dissolution method
Week 5	Calcium estimation experiment in the form of calcium oxalate
Week 6	Experimental determination of iron in the form of ferric oxide
Week 7	Experiment for the determination of nickel in the form of dimethylglyoxime
Week 8	Gravimetric Determination of Sulfate in Tap Water
Week 9	Cation Exchange Column Preparation and Determination of Total Capacity By Used NaCl
Week 10	Determination of Percentage From Sulfate Ion By Used Cation Exchange Chromatography
Week 11	Determination of Chloride By Anion Exchange Chromatography

Week 12	Separation of a Mixture of Halides By Paper Chromatography
Week 13	Separation of a Mixture of Colored Dyes By TLC
Week 14	Separation of Black Ink Components By Paper Chromatography
Week 15	Anion Exchange Column Preparation and Determination of Total Capacity By Used NaCl

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Analytical Chemistry, Douglas A. Skoog and Donald M. West. Eight Edition	Yes
Recommended Texts	1: Analytical Chemistry, Gary, Christian Sixth Edition 2: Chemical Analysis, Modern Instrumentation Methods and Techniques, Francis Rouessac and Annick Rouessac Second Edition	No
Websites	www.chemicalprocessing.com www.bytoco.com	

Grading Scheme

مخطط الدرجات

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Inorganic Chemistry III		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-23114		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Chem	College	CoS
Module Leader	Khansa Yousif Ahmed		e-mail
khansa@uodiyala.edu.iq			
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Teaching the students all the necessary information about the Inorganic chemistry subject which make them able to work in the field of Inorganic Chemistry . Give idea about the periodic properties of the elements, study the molecular symmetry, study the standard electrode potential, study and classification of Acids and Bases, Explanation of Main elements in the periodic table from group 3 to 7. Study the basis of Solid State Chemistry including crystal system of Cube. Study the Magneto chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students being able to understand Inorganic Chemistry ,understand Chemical structures of chemical compounds ,understand chemical reactions ,understand the experiments in Inorganic Chemistry .Skills of Knowledge- to remember , skills of analysis and skills of development.
Indicative Contents المحتويات الإرشادية	periodic properties such as ionic and atomic size. Ionization energy, electronegativity and electro affinity , Some periodic properties such as metallic and nonmetallic properties, oxidation state, oxides (acidic, basic and amphoteric) Oxides (Ionic, covalent and middle), Solid and Soft Acids and Bases

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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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	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The arrangement of elements inside the periodic table and studying the periodic properties

	such as ionic and atomic size. Ionization energy, electronegativity and electro affinity
Week 2	Some periodic properties such as metallic and nonmetallic properties, oxidation state, oxides (acidic, basic and amphoteric) Oxides (Ionic, covalent and middle)
Week 3	Colors of elements and complexes
Week 4	Standard electrode potential, the relationship between standard electrode potential and the relationship with pH of the solution
Week 5	Types of Electromotive force and Disproportionation
Week 6	Giving examples
Week 7	Molecular Symmetry, the importance of symmetry. Operations and elements of symmetry. Point groups
Week 8	Midterm Exam
Week 9	Giving examples
Week 10	Acids and Bases
Week 11	Solid and Soft Acids and Bases
Week 12	Solid and Soft Acids and Bases
Week 13	Magnetochemistry: Ferromagnetic and Anti-ferromagnetic,
Week 14	Magnetic momentum and EPR spin
Week 15	Orbital and spin role of magnetic momentum, ESR
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Purification of table salt
Week 2	Purification of table salt
Week 3	Find the percentage of water in a hydrolyzed compound

Week 4	Find the percentage of water in a hydrolyzed compound
Week 5	Determine the concentration of hydrogen peroxide in the solution
Week 6	Determine the concentration of hydrogen peroxide in the solution
Week 7	Preparation of potash alum
Week 8	Preparation of potash alum
Week 9	Detection of alum ions
Week 10	Detection of alum ions
Week 11	Calculation of the percentage of crystallization water in potash alum
Week 12	Calculation of the percentage of crystallization water in potash alum
Week 13	Preparation of barium peroxide
Week 14	Preparation of barium peroxide
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Inorganic chemistry, principles of structure and reactivity, 2nd ed., James E. Huheey, 1983 2-Inorganic chemistry, 3rd ed., Housecroft C.E. and	Yes
Recommended Texts		No
Websites	http://rapidshare.de/files/20322418/Patnaik_P._-_Handbook_of_inorganic_chemicals__McGraw_Hill_2003_.rar	

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	Thermodynamic Chemistry I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-23115		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Chem	College	CoS
Module Leader	Ahmed Najem Abd		e-mail: dr.ahmednajemabd@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Teach students the chemical reactions of gases and thermochemistry, and know how to solve problems related to them. Clarification of the energies of the bonds of organic interactions and knowledge of the first, second and third laws in thermodynamics And its practical applications aimed at developing and keeping pace with the scientific development of physical chemistry. Teaching and educating students on all the necessary and necessary information related to physical chemistry, which It qualifies them to work and research in all areas of physical chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to obtain knowledge and understanding of physical chemistry Enable students to obtain knowledge and understanding of gas reactions Enable students to obtain knowledge and understanding of the first, second and third laws of thermodynamics Enable students to obtain knowledge and understanding of examples and problems of physical chemistry.
Indicative Contents المحتويات الإرشادية	physical chemistry, gas reactions , laws of thermodynamics , Volume, pressure , work , first –law of thermodynamic , enthalpy cycle , heat capacity , joule –thomson effect , second laws of thermodynamics

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for physical chemistry. -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some practical problems..
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The gases
Week 2	The system and The energy
Week 3	Reversible and irreversible processes
Week 4	Volume, pressure , work
Week 5	The first –law of thermodynamic
Week 6	Enthalpy
Week 7	Enthalpy cycle
Week 8	Midterm Exam
Week 9	Standard enthalpy change of formation
Week 10	Heat capacity
Week 11	The joule experimental
Week 12	The joule –thomson effect
Week 13	The relationship between C_v and C_p
Week 14	The second laws of thermodynamics

Week 15	Final exam
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Set the burette spill constant
Week 2	Determine the molecular weight using the Dumas method.
Week 3	Determination of the molecular weight by the freezing point method of a non-volatile solid
Week 4	Determine the solubility of sodium sulfate in water and find the transition point
Week 5	Determine the solubility of benzoic acid in water at different temperatures and calculate the heat of the solution
Week 6	Solubility as a function of temperature
Week 7	Find the mutual solubility between phenol and water
Week 8	Part A: Thermochemistry/ Determination of calorimetric constant. Part B: Heat of neutralization/ Determination of heat of neutralization of a strong acid with a strong base. Part C: Heat of solution/ Determination of the heat of a solution.
Week 9	Equilibrium Constant/ Determination the formula of a complex formed between Copper (II) ion and Ammonia.
Week 10	Properties of dilute solutions/ Distribution of a solute between immiscible solvents.
Week 11	Relative molecular mass/ Determine the relative molecular mass of a polymer from viscosity measurements.
Week 12	Three components liquid system/ The Triple system.
Week 13	Adsorption from solution.
Week 14	Revision for all Experiment to prepare for the final exam+ Repetition for some experiments which some student have missed throughout the course.
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Phy.chem.gases and thermodynamics ,A.F.Dawood Al-Niaimi	Yes
Recommended Texts	1-Phy.chem. water J.Moor 2--Phy.chem. Danials 3-Atkins 4-Phy.chem. J.Barroue 4-Element of chemical thermodynamic L.K.Nash 5-Thermodynamics for chemistry	No
Websites	www.byPhysical Chemistry Books Adwww.scienceforums.com/forum/chemistr toco.com	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Organic Chemistry I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-23116		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Chem	College	CoS
Module Leader	Wassan Baqir Ali	e-mail	dr.wassan976@uodiyala.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	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Preparing specialists who are familiar with the basics of chemistry, theoretically and practically, who are able to meet the needs of the labor market, in addition to teaching chemistry to students of other departments in the Faculty of Science and some other faculties at the university. Conducting scientific research and trying to keep pace with the scientific development of chemistry. Cooperating with state institutions and the private sector by providing advice and scientific advice and conducting chemical analyzes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to gain knowledge and understanding of the intellectual framework of chemistry, enable students to acquire knowledge and understanding of international chemical standards, enable students to acquire knowledge and understanding of the laws of chemistry ,enable students to acquire knowledge and understanding of chemical analysis standards, enabling students to obtain knowledge and understanding of the law of the wrong use of chemicals . skills goals special to the programme scientific skills , reminding and analyzing skills and uses , development skills .
Indicative Contents المحتويات الإرشادية	Preparation of alkanes and their properties , Reactions of Alkanes , Nomenclature of alkenes and properties , Alkynes , Dienes, structure and synthesis and stabilization

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Clarification and explanation of the study materials by the academic staff through the blackboard, smart board and computer. Providing students with knowledge through homework assignments for academic vocabulary, Asking students to visit the library to obtain additional knowledge of the study materials .Improving students' skills by visiting websites to obtain additional knowledge of the study subjects .
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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	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to organic chemistry

Week 2	Hydrocarbons
Week 3	Saturated hydrocarbons, primarily methane and properties
Week 4	Preparation of alkanes and their properties
Week 5	Reactions of Alkanes
Week 6	Unsaturated hydrocarbons
Week 7	Nomenclature of alkenes and properties
Week 8	Midterm Exam
Week 9	Preparation method of alkenes
Week 10	Reaction of alkenes
Week 11	Alkynes , naming ,properties and properties
Week 12	Reactions of alkenes
Week 13	Dienes, structure and synthesis and stabilization
Week 14	Reactions of Dienes
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Laboratory safety information,
Week 2	Introduction to organic chemistry
Week 3	Experimental of measure the melting point of solid chemicals,
Week 4	experimental of boiling point of liquid chemicals
Week 5	Sublimation , Conducting a recrystallization
Week 6	experiment to purify solid chemicals
Week 7	Perform an extraction experiment ,

Week 8	Do a distillation experiment
Week 9	Experimental of simple distillation, Experimental of fractional distillation ,
Week 10	Experimental of thin layer chromatography
Week 11	Reactions of Dienes
Week 12	Reactions of Dienes
Week 13	Sodium smelting experiment and detection of some elements in organic compounds
Week 14	Sodium smelting experiment and detection of some elements in organic compounds
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Organic chemistry, Morrison and Boyd (1)	Yes
Recommended Texts	Organic Chemistry, Clayden J., Creeves N., Warren S and Wothers P., Oxford, 2001	No
Websites	www.chemicalprocessing.com	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Nanotechnology		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-23017		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	4
Administering Department	Chem	College	CoS
Module Leader	Omer Kazi	e-mail	omerkazi@uodiyala.edu.iq
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	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teach students the nanotechnology, and know how to solve problems related to them. Clarification material and its description according to classical and modern theories And its practical applications aimed at developing and keeping pace with the scientific development of nanotechnology .Teaching and educating students on all the necessary and necessary information related to nanotechnology, which It qualifies them to work and research in all areas of nanotechnology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to obtain knowledge and understanding of nanotechnology Enable students to obtain knowledge and understanding of Classification of nanomaterial .Enable students to obtain knowledge and understanding Characterization of nanomaterial .Enable students to obtain knowledge of Applications of nanomaterial in medicine , applications of nanomaterial in different fields
Indicative Contents المحتويات الإرشادية	Nanotechnology , classical and modern theories , Molecules, chemical bonds , Classification of nanomaterial , Characterization of nanomaterial , Applications of nanomaterial in medicine , applications of nanomaterial in different fields

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for nanotechnology -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some application..

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of nanotechnology

Week 2	Material and its description according to classical and modern theories
Week 3	Molecules, chemical bonds,
Week 4	crystals, grains,
Week 5	Effect of particle size on the material properties
Week 6	Classification of nanomaterials
Week 7	Properties of nanomaterials
Week 8	Midterm Exam
Week 9	Synthesis of nanomaterials methods
Week 10	Characterization of nanomaterials(STM,XRD,SAXRD,)
Week 11	Characterization of nanomaterials(SEM,TEM)
Week 12	Characterization of nanomaterials(AFM,)
Week 13	Characterization of nanomaterials(UV-Visible)
Week 14	Characterization of nanomaterials(Raman spectroscopy)
Week 15	Applications of nanomaterials in medicine , applications of nanomaterials in different fields
Week 16	Midterm Exam

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

Week 7	
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Nanomaterials and Nanochemistry . Catherine Brechignac ,Philippe Houdy ,Marcel Lamani 2008	Yes
Recommended Texts	Nanochemistry ,Biotechnology, Nanomaterials, and Their Application,Olena Fesenko, Leonid Yatsenko ,2017	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.				



الملحق ٤: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer II		Module Delivery
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ L Tutorial ☒ Practical ☐ Seminar
Module Code	UD23		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGI	Semester (s) offered	
Administering Department	All Department	College	All College of The University
Module Leader	Dr. Ali N. Albu-Rghaif	e-mail	ali.alburghaif@uodiyala.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	PhD
Module Tutor	Dr. Bashar Talib AL-Nuaimi	e-mail	alnuaimi_bashar@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	3/11/2024	Version Number	1.0

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



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Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر	
Module Aims أهداف المادة الدراسية	1. Training students on the fundamentals of computer networks. 2. Exploring the concept of e-commerce and electronic banking services. 3. Developing practical skills in computer troubleshooting. 4. Providing a foundational understanding of Artificial Intelligence (AI). 5. Introducing various applications of AI across industries. 6. Analyzing the social implications of AI on society and international relations. 7. Addressing ethical challenges associated with AI technology. 8. Exploring future trends and advancements in AI.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students can describe basic network components, explain their functions, and understand network security fundamentals. As well as diagnose and resolve common network issues. 2. Students will know the concepts of electronic banking services and identify different forms of online banking. 3. Students will be able to identify common hardware and software problems encountered by computer users. 4. Students will describe various AI techniques and approaches, and discuss their applications. 5. Students will be able to analyze the impact of AI on daily tasks and interactions. 6. Students will identify and discuss AI applications in fields such as education, healthcare, finance, transportation, marketing, and advertising. 7. Students will reflect on the potential societal changes brought by AI technology. 8. Students will analyze the role of ethics in guiding the development and application of AI. 9. Students will evaluate potential future applications of AI and consider their societal and technological implications
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Course Introduction Security and Networking, Basic Network Components, and Network Security Basics. 2. Working with Concepts of electronic banking services. 3. Working with Computer Troubleshooting. 4. Introduction to AI, Techniques, Approaches, Challenges, Ethical Considerations and Applications 5. AI and Society, Ethical Challenges in AI and The Future of AI



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Course Description	Security and Networking: What is a network? Types of networks. Basic network components. Network Security Basics. Understanding network threats. Network Troubleshooting E-Commerce: Concepts of electronic banking services, this includes online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues. Introduction to AI: Definition of AI, History of AI, AI Techniques and Approaches, Challenges and Ethical Considerations. AI in Our Daily Lives: AI in smartphones and virtual assistants like Siri or Google Assistant. Applications of AI: Education, Healthcare, Finance, Transportation, Marketing and Advertising. AI and Society: (How AI affects social, AI and international relations, AI and the future of humanity). Ethical Challenges in AI: (AI ethics, privacy and surveillance, the impact of AI on the job market). The Future of AI: (Future trends in AI, recent research and emerging technologies).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- In this course, students are guided by: - Using different examples. - Using different styles of discussion that aim to connect the theoretical and practical sides. - Asking questions and giving exercises that require analysis and conclusions related to lectures. - Encourage students to participate in discussions and do practical work. - Encourage students to work in groups.



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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	0.8
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% (5)	6 and 12	All
	Assignments	2	10% (5)	2 and 13	LO #1 to #8
	Projects / Lab.	1	10% (10)	Continuous	All
	Group Work	2	10% (5)	13	LO #2, #4 and #6
Summative assessment	Midterm Exam	1hr	10% (10)	9	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction Security and Networking
Week 2	E-Commerce
Week 3	Computer Troubleshooting
Week 4	Basic troubleshooting techniques and tools
Week 5	Introduction to AI
Week 6	AI Techniques and Approaches
Week 7	AI in Our Daily Lives
Week 8	AI and virtual assistants like Siri or Google Assistant
Week 9	Applications of AI: Education and Healthcare
Week 10	Applications of AI: Finance and Transportation
Week 11	Applications of AI: Marketing and Advertising
Week 12	AI and Society: AI and International Relations
Week 13	AI and Society: AI and the future of humanity
Week 14	Ethical Challenges in AI
Week 15	The Future of AI

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Networking Tools and Setup • Lab Orientation: Introduction to networking equipment and basic networking tools. • Setup of a simple network, understanding network topologies.
Week 2	Basic Network Configuration • Configuring IP addresses, subnetting, and basic router setup. • Ping and traceroute commands to test network connectivity.
Week 3	Network Security Basics • Hands-on with firewalls: Configuring basic firewall rules.



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	Understanding packet sniffing and analyzing network traffic with tools like Wireshark.
Week 4	Troubleshooting Network Issues - Common network troubleshooting commands: <code>ipconfig</code>. - Diagnosing connectivity issues and network troubleshooting scenarios.
Week 5	Introduction to E-Commerce Platforms - Overview of popular e-commerce platforms and payment gateways. - Setting up a demo e-commerce website and exploring payment options.
Week 6	Digital Banking Simulation Simulating online banking transactions (ATM, debit card, mobile banking).
Week 7	Computer Troubleshooting (Hardware) - Identifying and diagnosing common hardware issues. - Practicing component replacement (e.g., RAM, hard drive) and system optimization.
Week 8	Computer Troubleshooting (Software) - Diagnosing and fixing common software issues (e.g., system crashes, software conflicts). - Using system diagnostic tools and software repair utilities.
Week 9	Introduction to AI Tools and Software Exploring basic AI tools and platforms, such as Python libraries (NumPy, Pandas).
Week 10	AI in Daily Life: Virtual Assistants Setting up and experimenting with virtual assistants like Siri, Google Assistant, or Alexa.
Week 11	AI in Various Industries Case study labs focusing on AI applications in healthcare, finance, or marketing.
Week 12	AI and Society - Analyzing AI-driven social media algorithms. - Experimenting with recommendation systems and discussing ethical concerns.
Week 13	Ethical AI and Privacy Using tools to analyze privacy and surveillance aspects of AI (e.g., face recognition demo).
Week 14	Future Trends in AI Hands-on session with generative AI models or recent AI advancements.
Week 15	Capstone Lab Project and Review Students work on a mini-project integrating networking, e-commerce, troubleshooting, or AI.



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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- William Stallings, <i>Network Security Essentials: Applications and Standards</i>, 6th Edition, 2020. - Kenneth Laudon and Carol Guercio Traver, <i>E-Commerce 2024: Business, Technology, and Society</i>, 18th Edition, 2024 - Melanie Mitchell, <i>Artificial Intelligence: A Guide for Thinking Humans</i>, 1st Edition, 2019. - Stuart Russell and Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i>, 4th Edition, 2020.	No
Recommended Texts	- Wendell Odom, <i>CCNA 200-301 Official Cert Guide</i>, 1st Edition, 2019. - Mark Miller, <i>Digital Banking Tips and Solutions</i>, 1st Edition, 2021. - Dan Gookin, <i>Troubleshooting and Maintaining Your PC All-in-One For Dummies</i>, 3rd Edition, 2021. - Max Tegmark, <i>Life 3.0: Being Human in the Age of Artificial Intelligence</i>, 1st Edition, 2017. - Wendell Wallach, <i>The Ethics of Artificial Intelligence and Robotics</i>, 1st Edition, 2020.	
Websites	- Eli the Computer Guy (youtube.com/user/elithecomputerguy) - AI for Everyone by Andrew Ng (coursera.org) - Google AI Experiments (experiments.withgoogle.com/ai) - UNESCO AI and Society (unesco.org) - AI Ethics Lab (aiethicslab.com)	



**Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala
College of Engineering
Department of Computer Engineering**



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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB 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 2		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UD22			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGII	Semester of Delivery		
Administering Department	All	College	All	
Module Leader			e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name(if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	3/11/2024	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

Module Objectives أهداف المادة الدراسية	الهدف الأساس في تدريس اللغة العربية للأقسام العلمية : • اخذ الطالب الى روعة بيان القرآن الكريم ، وادراكه يقينا ان التعبير القراني تعبير فني مقصود ، كل لفظة ، وكل حرف وضع وضعاً فنياً مقصوداً • تقويم اللسان العربي . واعتماد العربية الفصحى في الحديث والكتابة ، ولزيادة رصيد الطالب من ادب وتراث ، على تناول النصوص المختارة من العصور الأدبية المختلفة ، لزيادة رصيد ادب لتراث والادب المعاصر . • التأكيد على دور الطالب في المتابعة واثراء المعرفة باللغة العربية وفنونها بجهد خاص ، ذا ما وضعنا مفاتيح المنهاج الدراسي لتقع على الطالب بعد ذلك مهمة فتح الأبواب والنوافذ الى مصادر المعرفة الواسعة . في جعل العربية الفصيحة تحتل موضع الصدارة وتجاوز العامة ، خدمة الى لغتنا العربية المقدسة . وحفاظا على قوتها وجمالها . • ومن نافلة القول في اهداف تدريس اللغة العربية : هي الجانب المحقق للوحدة وتلزمنا دوافع الوفاء بالحرص عليها والمحافظة على جوهرها .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	يمكن ايجاز مخرجات العلم لمادة اللغة العربية العامة لاقسام غير الاختصاص بالنسبة لمرحلة الدراسة الأولى بالاتي :- * علمه اليقين بان القرآن الكريم قد اعطى للغة قيمة عليا ، ومنزلة رفيعة . واجبه الحفاظ عليها وصيانتها من اللحن والخطا ، ومن كل ما يشوبها . * تمكين الطالب من قراءة النص القراني بنفسه وتمكنه من معرفة ما في الايات الكريمة من امور لغوية وبلاغية ومعنوية ، وتمكنه من فحصها فحصاً دقيقاً . * سيتمكن الطالب من معرفة ما في لغته العربية من دقة في التعبير واحكام في الفن والعلو في الصنعة . * إظهار القواعد العلمية ، والأسس الفنية ، التي يقوم عليها العمل الأدبي في جزئياته وكتباته . لبيان الروح الجمالية والإبداعية التي تتجلى في النص الأدبي . * فهم طبيعة اللغة من حيث اعرابها (علم النحو) ، من الفعل والفاعل الذي يقع عليه فعل الفاعل ، والحال والتمييز والالوان الاعرابية لما بعد التمييز . * تمكين الطالب من التفريق بين الافعال الثلاثية والرابعة والخماسية ، وتمكينه من التمييز بين الافعال ومصادر الافعال ، فالفعل : لفظ يدل على حدث الى جانب دلالته على الزمن ، مصدره لا يدل على زمنه أي زمن فعله . * التعريف بالمفهوم الزمني الفني : للحدث والمعاصرة في الأدب ، وإعطاء صورة لتطور أدب وصولا إلى أدب العصر الحديث . * معرفة الطالب لمفهوم النثر العربي ، وكيفية تطور النثر من القديم وكيفية تطور من القديم الى العصر الحديث من: المقالة والقصة والمسرحية ، ومعرفة اهم خصائصه الفنية ، وتطور المصطلح من النثر الى مفهوم السرد في العصر الحديث . * تعريف الطالب بمفهوم الشعر الحر او " شعر التفعيلة " ورواد مدرسة الشعر الحر ، نازك الملائكة وبدر شاكر السياب ، وكيف تفجرت حركة الشعر كلون من الوان الاحتجاج على الواقع الفني العربي .
Indicative Contents المحتويات الإرشادية	1- الاهتمام بالكلام ، ومحاولة التعمق في دراسة قواعده واصوله وتاريخه . 2- الاهتمام بقواعد اللغة تاصيلًا وتقييدًا ، وتاريخ ادبها تسجيلًا وتدوينًا ، ونقد نصوصها تفسيرًا وتاويلًا .

	3- الفهم الدقيق لاصوات اللغة العربية ، ومعرفة مخارج الاصوات ، ومعرفة مخرج كل صوت من اصوات العربية بطريقة مبسطة .وعلاقة الدال بالمدلول . 4- البحث في نشأة اللغة ، وعلاقتها بغيرها ، وخصائص اصواتها ، وابنية مفرداتها وتراكيبها . 5- البحث في عناصر لهجاتها وتطور دلالاتها ، والعوامل التي اثرت فيها ، والقوانين التي تحكم الصلة بين الفاظها . 6- الاهتمام بالكلام ومحاولة التعمق في دراسة قواعده واصوله وتاريخه . 7- توليد القدرة على تذوق النصوص ، وفتح نافذة القدرة على التحليل والتاويل ، ومعرفة ما يريد ان يقوله النص الادبي . 8- دراسة اساسيات النحو العربي وقواعد الجملة العربية . 9- التعرف على تراكيب الجملة الفعلية والاسمية والمركبة .
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	ليحقق التدريسي اهداف ونواتج التعلم المستهدفة لا بد من تحقيق الاتي : ١_ التركيز على استراتيجيات تقود الى التعلم النشط ، والتأكيد على دور المتعلم واثارة اهتمامه ودفعه الى المشاركة الايجابية ٢_ الاكثار من النصوص العربية العالية ٣_ وان نعد بعض القطع للقراءة يمتزج فيها درس القواعد بدرس الادب؛ فان ذلك ادعى لتنمية ذوق الطالب في الفهم والحس والكلمات والاساليب واستعمالها . ٤_ منح التدريسي حرية اختيار قطع للقراءة من كتب الادب والنصوص ومن ادب المناسبات الذي ينشر في الصحف والمجلات ، لتصحيح النطق عند الطالب ، وتعويد على القراءة الصحيحة الخالية من اللحن . ٥_ تقع على عاتق التدريسي مهنة اساسية وهي التشويق والتقويم والتصويب في تدريسه اللغة_ العربية العامة لأقسام غير اختصاص . ٦_ تنشيط عنصر الاعتزاز باللغة العربية لدى طالب العلم وتأصيله والعمل على زرع محبته للغة العربية بوصفها اللغة الام لغة القرآن الكريم لغة الاعجاز والبيان . من خلال عرضه لقصص تراثية تتعلق بحرص العربي على لغته والاعتزاز بها .

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	4	20% (5)	3 , 5,8,11	LO #1...#3, #4...#5, #7&#8, #9... #11
	Assignments	2	10% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	(الفصل الأول) مهارات التعبير و فن الإنشاء و مهارات التعبير : (1) كتابة الإنشاء .
Week 2	(2) كتابة الخاطرة و المقالة .
Week 3	(الفصل الثاني) من القواعد الصرفية : (3) الأفعال الثلاثية و الرباعية و الخماسية و السداسية .
Week 4	(4) من مصادر الأفعال .
Week 5	(الفصل الثالث) القواعد النحوية : (5) الفاعل ، و نائب الفاعل .
Week 6	(6) الأفعال الناقصة (كان و أخواتها) .
Week 7	(7) الأحرف المشبهة بالفعل (إنَّ و أخواتها) .
Week 8	(8) من أنواع المفاعيل (المفعول به + المفعول المطلق + ظرفا الزمان و المكان) .
Week 9	(9) الحال ، و التمييز ، و الاستثناء .
Week 10	(10) من أنواع التوابع : (النعت و التوكيد) .
Week 11	(11) قواعد كتابة العدد .
Week 12	(الفصل الرابع) الأدب العربي : (12) نصوص من الشعر الحديث (محمد مهدي الجواهري) .
Week 13	(13) نصوص من الشعر الحر (أ) بدر شاكر السياب .
Week 14	(14) (ب) (نازك الملائكة) .
Week 15	(15) من فنون النثر الحديث (الرواية و المسرحية) .

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

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- التعبير القرآني – الدكتور : فاضل السامري 2- شرح ابن عقيل على الفية ابن مالك – لابن عقيل 3- علم اساليب البيان – غازي يموت. 4- اللغة العربية لاقسام غير الاختصاص مجموعة من اساتذة اللغة العربية .	
Recommended Texts		
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.

Level Two

Semester Four

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-24119		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	4
Administering Department	Chem	College	CoS
Module Leader	Marwah Hashim Abdulateef	e-mail	marwahhashim@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Learning students analytical chemistry fundamentals in specific knowledge of gravimetric analysis chemistry, classification of gravimetric analysis, precipitation analysis, types of precipitating reagents, inorganic precipitants and organic precipitants, properties of precipitant used for gravimetric analysis, calculation of gravimetric analysis, gravimetric factor, solubility of precipitates and Solubility product (K_{sp}), calculation the solubility from K_{sp}, solubility problems, The affected factors on the solubility of the precipitates, Contamination of the precipitates and its types , avoiding impurities, digestion of precipitates, washing solutions, drying and ignition of the precipitates, Statistic in analytical chemistry with examples. - Learning students, the fundamentals of analytical separation methods: classification of separation methods, masking agents, liquid-liquid extraction, solvent extraction fundamentals, separation and classification of chromatography, separation by ion exchanges. - Teaching and learning students all the subjects, that related to the analytical chemistry course, which allow them to be qualified working in different aspects of analytical chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to gain knowledge and understanding of the intellectual framework of analytical chemistry. Enable students to acquire knowledge and understanding of international chemical standards. Enable students to acquire knowledge and understanding of the laws of chemistry. Enable students to acquire knowledge and understanding of chemical analysis standards in gravimetric chemistry and separation methods.- Enabling students to obtain knowledge and understanding of the law of the wrong use of chemicals.
Indicative Contents المحتويات الإرشادية	analytical chemistry fundamentals, gravimetric analysis chemistry, precipitation analysis, precipitating reagents, inorganic precipitants , organic precipitants, properties of precipitant, calculation of gravimetric analysis, gravimetric factor, solubility of precipitates ,Solubility product (K_{sp}), solubility problems, affected factors on the solubility of the precipitates, Contamination of the precipitates,

	impurities, digestion of precipitates, washing solutions, , Statistic in analytical chemistry.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for analytical chemistry. -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some practical problems..
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Washing of precipitates, washing solutions, drying and ignition of the precipitates
Week 2	Statistic in analytical chemistry with examples
Week 3	Introduction and fundamentals of separation methods, and their types
Week 4	Classification of separation methods, their advantages with examples,
Week 5	Separation by chemical precipitation and their applications with examples, masking agents
Week 6	separation by distillation fundamentals, their types and applications, affected factor on distillation separation
Week 7	separation, solvent extraction fundamentals, extraction methods, liquid-liquid extraction, solid-liquid extraction, extraction efficiency, examples
Week 8	Midterm Exam
Week 9	The affected factor on the extraction separation, the effect of pH, the effect of complexes formation, extraction techniques
Week 10	Introduction of Chromatographic separation, chromatographic separation fundamentals,

	chromatographic methods classification, mobile phase, and stationary phase
Week 11	Thin layer chromatography, paper chromatography, column chromatography with adsorption, gas chromatography, applications with examples
Week 12	Chromatographic separation techniques, separation by HPLC technique, ion exchange
Week 13	Chromatographic analysis fundamentals, Van-Deemter equation, retention time, rate separation and resolution, resolution with retention time, rate and plate theories, examples with problems
Week 14	Separation by ion exchanges fundamentals, anion exchange, cation exchange, ion exchanges classification, capacity of ion exchange, equilibrium of ion exchange with examples and applications
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Experiment for determination of chloride in the form of silver chloride
Week 2	Experiment for determination of chloride in the form of silver chloride
Week 3	Experiment of determination of sulfate in the form of barium sulfate
Week 4	Experiment of determination of sulfate in the form of barium sulfate
Week 5	Experimental determination of lead in the form of lead chromate
Week 6	Experimental determination of lead in the form of lead chromate
Week 7	Experiment with the determination of aluminum in the form of aluminum oxanilate
Week 8	Experiment with the determination of aluminum in the form of aluminum oxanilate
Week 9	Experiment with determination of magnesium in the form of magnesium pyrophosphate
Week 10	Experiment with determination of magnesium in the form of magnesium pyrophosphate
Week 11	Laboratory analysis of a cement sample
Week 12	Laboratory analysis of a cement sample
Week 13	Define the student By direct and indirect methods of separation

Week 14	Exam
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of Analytical Chemistry, Douglas A. Skoog and Donald M. West. Eight Edition	Yes
Recommended Texts	1: Analytical Chemistry, Gary, Christian Sixth Edition 2: Chemical Analysis, Modern Instrumentation Methods and Techniques, Francis Rouessac and Annick Rouessac Second Edition	No
Websites	www.chemicalprocessing.com www.byto.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Inorganic Chemistry IV		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-24120		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	4
Administering Department	Chem	College	CoS
Module Leader	Khansa Yousif Ahmed	e-mail	khansa@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Teaching the students all the necessary information about the Inorganic chemistry subject which make them able to work in the field of Inorganic Chemistry . Give idea about the periodic properties of the elements, study the molecular symmetry, study the standard electrode potential, study and classification of Acids and Bases, Explanation of Main elements in the periodic table from group 3 to 7. Study the basis of Solid State Chemistry including crystal system of Cube. Study the Magneto chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students being able to understand Inorganic Chemistry ,understand Chemical structures of chemical compounds ,understand chemical reactions ,understand the experiments in Inorganic Chemistry .Skills of Knowledge- to remember , skills of analysis and skills of development.
Indicative Contents المحتويات الإرشادية	periodic properties such as ionic and atomic size. Ionization energy, electronegativity and electro affinity , Some periodic properties such as metallic and nonmetallic properties, oxidation state, oxides (acidic, basic and amphoteric) Oxides (Ionic, covalent and middle), Solid and Soft Acids and Bases

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard. Explanation and clarification. Providing students with the basics and additional topics related to the outputs of inorganic chemical thinking and analysis. Forming discussion groups during lectures to discuss inorganic chemistry topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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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	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	basics of solid state chemistry Packing methods, Cubic crystal system

Week 2	Ionic compounds and X-Ray
Week 3	Examples and solutions
Week 4	Introduction to Boron group , Oxidation state properties, reactions and compounds
Week 5	Introduction to Carbon group , Oxidation state properties, Carbon oxides and carbides
Week 6	Introduction to Nitrogen group , Oxidation state properties, Nitrogen oxides Nitrogen and hydrogen compounds
Week 7	Introduction to Fifth group (phosphorous, Arsenic, Bismuth and Antimon properties and compounds
Week 8	Midterm Exam
Week 9	Introduction to Oxygen, Coordination numbers of Oxygen, Ozone, Oxide ion, Peroxides, Superoxide, ozonide
Week 10	Introduction to Sulfur and other group elements properties and existence.
Week 11	Sulfur compounds and other group elements (oxides, oxoacides fluorides sulfides hydrides
Week 12	Introduction to Halogens, properties Oxides, oxidation states and pseud-halides
Week 13	Activity series of halogens, Reactions, oxoacides hydrogen halides ,, ionic and covalent halides
Week 14	Introduction to Noble gases, Xenon compounds
Week 15	Midterm Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Study of some barium peroxide reactions
Week 2	Study of some barium peroxide reactions
Week 3	Estimation of water hardness
Week 4	Estimation of water hardness
Week 5	Properties of magnesium metal and magnesium ion interactions
Week 6	Properties of magnesium metal and magnesium ion interactions

Week 7	Preparation of chrome alum
Week 8	Preparation of chrome alum
Week 9	Detection of chromium alum ions
Week 10	Detection of chromium alum ions
Week 11	Investigation of the reaction between copper sulfate and sodium hydroxide
Week 12	Investigation of the reaction between copper sulfate and sodium hydroxide
Week 13	Some reagents and graph
Week 14	Some reagents and graph
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Inorganic chemistry, principles of structure and reactivity, 2nd ed., James E. Huheey, 1983 2-Inorganic chemistry, 3rd ed., Housecroft C.E. and	Yes
Recommended Texts		No
Websites	http://rapidshare.de/files/20322418/Patnaik_P._-_Handbook_of_inorganic_chemicals__McGraw_Hill_2003_.rar	

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	Thermodynamic Chemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-24121		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	4
Administering Department	Chem	College	CoS
Module Leader	Ahmed Najem Abd		e-mail: dr.ahmednajemabd@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teach students the chemical reactions of gases and thermochemistry, and know how to solve problems related to them. Clarification of the energies of the bonds of organic interactions and knowledge of the first, second and third laws in thermodynamics And its practical applications aimed at developing and keeping pace with the scientific development of physical chemistry. Teaching and educating students on all the necessary and necessary information related to physical chemistry, which It qualifies them to work and research in all areas of physical chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to obtain knowledge and understanding of physical chemistry Enable students to obtain knowledge and understanding of gas reactions Enable students to obtain knowledge and understanding of the first, second and third laws of thermodynamics Enable students to obtain knowledge and understanding of examples and problems of physical chemistry. knowledge skills – remembering , the skills of recall and analysis Use and development skills
Indicative Contents المحتويات الإرشادية	physical chemistry, gas reactions , Entropy, Entropy of mixing ideal gases , Maxwell reaction , Gibbs-Helmholtz equation , Statistical thermodynamics , The Boltzmann law

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for physical chemistry. -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some practical problems..
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Entropy
Week 2	Spontaneous processes and entropy
Week 3	Entropy changes for typical processes
Week 4	Entropy of mixing ideal gases
Week 5	Free energy functions
Week 6	Maxwell reaction
Week 7	Gibbs-Helmholtz equation
Week 8	Midterm Exam
Week 9	Phase equilibrium
Week 10	Phase diagrams of Mixtures
Week 11	Liquid –Liquid phase diagrams
Week 12	Statistical thermodynamics
Week 13	The Boltzmann law
Week 14	The partition function, Thermodynamics functions for rotation, vibration, and electronic excitation
Week 15	Midterm Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Phase diagram of a binary group consisting of (solid - solid)
Week 2	Phase diagram of a binary group consisting of (solid - solid)
Week 3	Determine the relative and absolute densities of an unknown liquid
Week 4	Determine the relative and absolute densities of an unknown liquid
Week 5	Find the density of water at different temperatures
Week 6	Find the density of water at different temperatures
Week 7	Adsorption in solutions
Week 8	Adsorption in solutions
Week 9	Adsorption in solutions
Week 10	Adsorption in solutions
Week 11	Distribution of acetic acid between benzene and water
Week 12	Distribution of acetic acid between benzene and water
Week 13	Distribution of acetic acid between benzene and water
Week 14	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Phy.chem.gases and thermodynamics ,A.F.Dawood Al-Niaimi	Yes
Recommended Texts	1-Phy.chem. water J.Moor 2--Phy.chem. Danials 3-Atkins 4-Phy.chem. J.Barroue 4-Element of chemical thermodynamic L.K.Nash	No

	5-Thermodynamics for chemistry	
Websites	www.byPhysical Chemistry Books Adwww.scienceforums.com/forum/chemistr toco.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Organic Chemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-24122		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	4
Administering Department	Chem	College	CoS
Module Leader	Wassan Baqir Ali	e-mail	dr.wassan976@uodiyala.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	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Preparing specialists who are familiar with the basics of chemistry, theoretically and practically, who are able to meet the needs of the labor market, in addition to teaching chemistry to students of other departments in the Faculty of Science and some other faculties at the university. Conducting scientific research and trying to keep pace with the scientific development of chemistry. Cooperating with state institutions and the private sector by providing advice and scientific advice and conducting chemical analyzes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to gain knowledge and understanding of the intellectual framework of chemistry, enable students to acquire knowledge and understanding of international chemical standards, enable students to acquire knowledge and understanding of the laws of chemistry ,enable students to acquire knowledge and understanding of chemical analysis standards, enabling students to obtain knowledge and understanding of the law of the wrong use of chemicals . skills goals special to the programme scientific skills , reminding and analyzing skills and uses , development skills .
Indicative Contents المحتويات الإرشادية	Preparation of alkanes and their properties , Reactions of Alkanes , Nomenclature of alkenes and properties , Alkynes , Dienes, structure and synthesis and stabilization

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Clarification and explanation of the study materials by the academic staff through the blackboard, smart board and computer. Providing students with knowledge through homework assignments for academic vocabulary Asking students to visit the library to obtain additional knowledge of the study materials .Improving students' skills by visiting websites to obtain additional knowledge of the study subjects .
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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	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Aliphatic cyclic compounds, structure and physical properties, synthesis, and reactions

Week 2	Aromaticity, structure, and stability of benzene
Week 3	The Hückel $4n + 2$ rule, synthesis and electrophilic aromatic substitution
Week 4	Electrophilic aromatic substitution of aromatic compounds
Week 5	Arenes, structure, synthesis, and reactions
Week 6	Alkyl halide, structure and physical properties, synthesis of alkyl halides
Week 7	reactions SN1 , Reactions and mechanism of SN2
Week 8	Midterm Exam
Week 9	Reactions and mechanism of E1
Week 10	Reactions and mechanism of E2
Week 11	Alcohols, structure and physical properties
Week 12	synthesis, and reactions of Alcohols
Week 13	Ethers, structure and physical properties
Week 14	synthesis and reactions of Ethers
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Detection of nitrogen in organic chemical compounds
Week 2	Detection of nitrogen in organic chemical compounds
Week 3	Detection of sulfur in organic chemical compounds
Week 4	Detection of sulfur in organic chemical compounds
Week 5	Detection of halogens in organic chemical compounds
Week 6	Detection of halogens in organic chemical compounds
Week 7	Preparation and detection of CH ₄ methane, Study the properties and interactions of alcohols

Week 8	Preparation and detection of CH ₄ methane, Study the properties and interactions of alcohols
Week 9	Conducting an experiment to detect alcohols in general and especially to find out primary, secondary or tertiary alcohol using chemicals
Week 10	Conducting an experiment to detect alcohols in general and especially to find out primary, secondary or tertiary alcohol using chemicals
Week 11	Detection of iodoform , properties of alkyl halides , Preparation of alkyl halide
Week 12	Detection of iodoform , properties of alkyl halides , Preparation of alkyl halide
Week 13	Alcohols, structure and physical properties , synthesis, and reactions of Alcohols
Week 14	Alcohols, structure and physical properties , synthesis, and reactions of Alcohols
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Organic chemistry, Morrison and Boyd (1)	Yes
Recommended Texts	Organic Chemistry, Clayden J., Creeves N., Warren S and Wothers P., Oxford, 2001	No
Websites	www.chemicalprocessing.com	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Statistics		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-24024		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level		2	
Administering Department		Chem	College
Module Leader		Suhad Kareem Hamid	e-mail
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification
Module Tutor		Name (if available)	e-mail
Peer Reviewer Name		Name	e-mail
Scientific Committee Approval Date		01/06/2023	Version Number
			1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Providing the student the skills of understanding, applying and analyzing statistical and probability measures in quantitative and descriptive data in various administrative fields , Giving the graduate the skills of collecting, presenting and analyzing data in order to extract and draw conclusions about the various phenomena under study , Use of statistical methods in different fields
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to obtain knowledge and understanding of advanced mathematics Enable students to obtain knowledge and understanding of the structure of statistic Enable students to obtain knowledge and applying and analyzing statistical and probability measures , Solving issues related to scientific material, writing scientific reports and analyzing data , Giving lectures and using textbooks ,knowledge skills – remembering, the skills of recall and analysis ,skills of use and modeling
Indicative Contents المحتويات الإرشادية	The statistics course for second-year Chemistry students covers an introduction to statistics and its importance in scientific data analysis, types of data and methods of presentation, measures of central tendency (mean, median, mode), and measures of dispersion (range, standard deviation). It also includes basic probability concepts, probability distributions—especially the normal distribution—correlation and simple linear regression, and hypothesis testing using the t-test. The course emphasizes practical applications in chemistry, such as analyzing experimental results and instrument readings.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Power point lecture method using data show and whiteboard.
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	Explanation and clarification. Providing students with the basics and additional topics related to the outputs of mathematics thinking and analysis. Forming discussion groups during lectures to discuss mathematics topics that require thinking and analysis. Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics. Giving students homework that requires self-explanations in causal ways.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	events, elementary concepts and rules about probabilities, random events, types of random events, regular events, and methods of calculating probabilities
Week 2	independent events, dependent events, the constitution of total probabilities
Week 3	conditional probabilities, totality and Bayesian theory, numerical computation methods, permutation and combinations
Week 4	definition of random variable, mathematical and statistical definition
Week 5	discrete random variable (intermittent), probability distribution and probability density function
Week 6	continuous random variable (continuous), probability distribution and probability density function
Week 7	the statistical features of the random variable (expectation, variance and standard deviation)
Week 8	Midterm Exam
Week 9	probability distribution function, probability density function
Week 10	probability distributions, binomial distribution, cumulative distribution function for binomial distribution
Week 11	Poisson probability distribution
Week 12	normal distribution law, standard normal distribution
Week 13	Estimating the parameters of a distribution, method of movement
Week 14	maximum likelihood, least squares

Week 15	Final Exam
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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Mathematical Statistics Hogg & Criug Elements of Mathematical Stats. Ractliffe	Yes
Recommended Texts	www.mathwords.com	No
Websites	www.freebookcentre.net	

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.



الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	جرائم نظام البعث في العراق		Module Delivery
Module Type	Basic learning activities		☒ Theory ☒ Lecture ☐ Lab ☐ L Tutorial ☐ Practical ☒ Seminar
Module Code	UD24		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	جميع اقسام الكلية	College	College of
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	MSc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	9/09/2024	Version Number	1.0

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



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Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. التعرف على ماهية الجريمة لغة واصطلاحاً وماهية أقسام الجرائم. 2. التعرف على جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م. 3. تنمية وعي الطلب بجرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا لسنة 2005م. 4. دراسة الجرائم التي ارتكبتها نظام البعث على مدى سنوات طويلة واثارها النفسية والاجتماعية . 5. التعرف على صور انتهاكات حقوق الانسان وجرائم السلطة والتعرف على الجرائم البيئية لنظام البعث في العراق. 6. تعزيز الوعي بحقيقة ما جرى من مآسي المقابر الجماعية المرتكبة من النظام البعثي في العراق.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. تمكين الطالب من معرفة المفاهيم النظرية للجرائم وأركان الجرم . 2. تمكين الطالب من معرفة أقسام الجرائم . 3. تمكين الطالب من معرفة قانون المحكمة الجنائية العراقية العليا لسنة 2005. 4. فهم تشكيل المحكمة الجنائية العراقية العليا لسنة 2005 والتعرف على تشكيل المحكمة إجراءات التقاضي امام المحكمة. 5. يتعلم الطالب أنواع الجرائم الدولية على وفق النظام الاساسي للمحكمة الجنائية الدولية. 6. معرفة الطالب بالاثار النفسية والاجتماعية لجرائم نظام البعث. 7. يتمكن الطالب من فهم موقف النظام البعثي من الدين من خلال فهم عقيدة النظام السياسي سبيلاً لفهم موقف النظام من الدين. 8. يتمكن الطالب من التعرف على صور أنتهاكات القوانين العراقية وأنتهاكات حقوق الانسان وجرائم السلطة. 9. تمكين الطالب من التعرف على بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث. 10- يتعرف الطالب على أماكن السجون والاحتجاز لنظام البعث. 11- معرفة الطالب بالجرائم البيئية وبأثار الجرائم البيئية لنظام البعث، ويتعرف جرائم المقابر الجماعية.
Indicative Contents المحتويات الإرشادية	الجزء الاول : جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لعام 2005م، والجرائم النفسية والاجتماعية وأثارها وابرز انتهاكات النظام البعثي في العراق: التعريف بالجريمة لغة واصطلاحاً، اركان واقسام الجريمة (2 ساعة). جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م : أنواع الجرائم الدولية، القرارات الصادرة من المحكمة الجنائية العليا (2 ساعة). وابرز القضايا التي نظرت فيها المحكمة (2 ساعة). الجرائم النفسية والاجتماعية وأثارها وابرز انتهاكات النظام البعثي في العراق: الجرائم النفسية، اليات الجرائم النفسية (2 ساعة). اثار الجرائم النفسية ، الجرائم الاجتماعية (2 ساعة) . عسكرة المجتمع، موقف النظام البعثي من الدين (2 ساعة) . أنتهاكات القوانين العراقية، صور أنتهاكات حقوق الانسان (2 ساعة) . جرائم السلطة، بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث (2 ساعة). الجزء الثاني : الجرائم البيئية لنظام البعث في العراق، جرائم المقابر الجماعية : الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – أستعمال الاسلحة المحرمة دولياً ومخاطر الالغام. (2 ساعة). التلوث بالمواد المشعة، أثار أستخدام الاسلحة المحرمة دولياً (2 ساعة). تدمير المدن والقرى (سياسة الارض المحروقة) : قصف المدن، قصف العتبات المقدسة والمساجد والحسينيات، معركة نهر جاسم ، حرق آبار النفط (2 ساعة). تجفيف الاهوار و أثارها البيئية والاجتماعية والاقتصادية (2 ساعة). ، تجريف بساتين النخيل والاشجار والمزروعات (2 ساعة). جرائم المقابر الجماعية وموقف الامم المتحدة منها (2 ساعة). احداث المقابر الجماعية المرتكبة من النظام البعثي في العراق، التصنيف الزمني لمقابر ابادة الجماعية في العراق للمدة 1963- 2003 (2 ساعة).



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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- زيادة وعي الطالب بالجرائم التي ارتكبها نظام البعث في العراق وحقيقة ما جرى من مآسي وويلات بحق الشعب العراقي. 2- اكتساب الطالب ثقافة عامة بماهية الجرائم واركائها واقسامها وموقف المشرع العراقي منها. 3- زيادة وعي الطالب بموقف القانون الدولي والمحاکم الجنائية الدولية من الجرائم والانتهاكات التي ترتكبها الانظمة السلطوية.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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
	Projects / tutorial.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	محاضرة تعريفية عن المادة وأهميتها.
Week 2	التعريف بالجريمة لغة واصطلاحاً، أقسام الجريمة، جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م ، أنواع الجرائم الدولية.
Week 3	القرارات الصادرة من المحكمة الجنائية العليا، وأبرز القضايا التي نظرت فيها المحكمة.
Week 4	الجرائم النفسية، أليات الجرائم النفسية.
Week5	اثار الجرائم النفسية، الجرائم الاجتماعية
Week 6	عسكرة المجتمع، موقف النظام البعثي من الدين.
Week 7	انتهاكات القوانين العراقية، صور انتهاكات حقوق الانسان، جرائم السلطة.
Week 8	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث.
Week 9	الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – استعمال الاسلحة المحرمة دولياً ومخاطر الالغام.
Week 10	التلوث بالمواد المشعة، أثار استخدام الاسلحة المحرمة دولياً
Week 11	تدمير المدن والقرى (سياسة الارض المحروقة).
Week 12	تجفيف الأهوار أثارها البيئية والاجتماعية والاقتصادية .
Week 13	تجريف بساتين النخيل والاشجار والمزروعات.
Week 14	جرائم المقابر الجماعية، أحداث المقابر الجماعية المرتكبة من النظام البعثي في العراق.
Week 15	التصنيف الزمني لمقابر الابداء الجماعية في العراق للمدة 1963 - 2003.
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	المنهج المقرر الدراسي للجامعات الحكومية و الأهلية كافة كتاب وزارة التعليم والبحث العلمي ذي العدد (ت م 3 / 7588 في 2023/10/19)	نعم
Recommended Texts		لا
Websites		



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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	English Language 2		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UD21			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGII	Semester of Delivery		
Administering Department	All	College	All	
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	Name(if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	3/11/2024		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

Module Objectives أهداف المادة الدراسية	The module aims at enabling students to learn and understand the written and spoken form of English. It also aims at teaching functional English to learners and honing their reading, writing and listening skills>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Read and understand simple texts in English. 2. Answer simple comprehension questions and match sentences about texts. 3. Reconstruct texts by reordering sentences. 4. Understand the main idea of a text. 5. Identify specific information in a text. Writing and paraphrasing paragraphs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. i) Grammar has a core place in language teaching and learning. ii) A wide variety of practice tasks in all the four skills are essential to language learning. iii) Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational or idiomatic.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Headway's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills with communicative role-plays and personalization. Authentic material from a variety of sources enables students to see new language in context, and a range of comprehension tasks, language and vocabulary exercises, and extension activities practice the four skills. 'Everyday English' and 'Spoken grammar' sections practice real-world speaking skills, and a writing section for each unit at the back of the book provides models for students to analyze and imitate.
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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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	4	20% (5)	3 , 6,8,11	LO #1...#3, #4...#6, #7&#8, #9... #11
	Assignments	2	10% (5)	5 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered				
Week 1	Course Introduction (Course material and objectives, learning outcomes, lessons and assessment discussed with the learners).				
Week 2	Unit 1. Getting to know you Reading: People, the great communicators' - the many ways we communicate Listening: Neighbours - Steve and Mrs Snell talk about each other as neighbours Speaking: Information gap - Joy Darling Writing: Informal letters - A letter to a pen friend Grammar: Tenses: present, past and future				
Week 3	Unit 2. The way we live Reading: 'Living in the USA' - three people talk about their experiences Listening: You drive me mad (but I love you)! - what annoys you about the people in your life? Speaking: Information gap - people's Lifestyles. Exchanging information about immigrants to the USA Writing: Linking words, but, however. Describing a person Grammar: Present tense , present continuous				
Week 4	Unit 3. It all went wrong Reading: 'The burglars' friend'. Newspaper stories. A short story - 'The perfect crime Listening: A radio drama - 'The perfect crime Speaking: Information gap - Zoe's party. Telling stories Writing: Linking words: while, during, and for. Writing a story Grammar: Past tenses: Past Simple and past continuous				
Week 5	Unit 4. Let's go shopping! Reading: 'The best shopping street in the world' Listening: 'My uncle's a shopkeeper' , Buying things Speaking: Town survey - the good things and bad things about living in your town, Discussion - attitudes to shopping p Writing: Filling in forms Grammar: Quantity , Articles				
Week 6	Assessment Test 1. Feedback and Remedial Work				

Week 7	Unit 5. What do you want to do? Reading: 'Hollywood kids - growing up in Los Angeles ain't easy' Listening: A song - You've got a friend Speaking: What are your plans and ambitions? Being a teenager Writing: Writing a postcard Grammar: Verb patterns 1, future intentions
Week 8	Unit 6. Tell me! What's it like? Reading: A tale of two millionaires' - one was mean and one was generous Listening: Living in another country — an interview with a girl who went to live in Sweden Speaking: Information gap – comparing cities Writing: Relative clauses 1 who/that/which/where. Describing a place Grammar: Comparative and superlative adjectives big, bigger, biggest, good, better, best
Week 9	Unit 7. Famous couples Reading: Celebrity interview from Hi! Magazine with the pop star and the footballer who are in love Listening: An interview with the band Style Speaking: Mingle - Find someone who ... Role play - interviewing a band Writing: Relative clauses 2 who/ which/ that as the object. Writing a biography Grammar: Present Perfect and Past Simple
Week 10	Unit 8. Do's and don'ts Reading: Problems and suggestions Listening: Holidays in January - three people's advice on what to do in their country in January Speaking: Jobs - a game. Discussion - house rules, Asking questions about place Writing: Writing letters- Formal letters Grammar: have (got) to, should, must
Week 11	Assessment Test 2. Feedback and Remedial Work
Week 12	Unit 9. Going places Reading: The world's first megalopolis - a city of 40 million people Listening: Life in 2050 - an interview with Michio Kaku, Professor of Theoretical Physics Speaking: What will you do? Discussion - what will life be like in the 21st century? Writing: Linking words 2, Advantages and disadvantages Grammar: Time and conditional clauses
Week 13	Unit 10. Scared to death Reading: 'Don't look down' - walking on a dangerous footpath, 'Into the wild' Listening: When I was young p80 It was just a joke - a boy called Jamie kidnapped his friend Speaking: 'When I was young' - talking about your childhood Writing: Writing letters Formal and informal letters 1 Grammar: Verb patterns 2 manage to do, used to do, go walking, Infinitives, Purpose
Week 14	Unit 11. Things that changed the world Reading: Three plants that changed the world - tobacco, sugar and cotton Listening: The world's most common habit: chewing gum Speaking: Exchanging information about three plants Writing: Writing a review of a book or film Grammar: Passive
Week 15	Unit 12. Dreams and reality Reading: The vicar who's a ghostbuster Listening: An interview with a woman who heard voices Speaking: Giving advice - If I were you, I'd..... Writing: Writing letters Expressions in different kinds of letters Grammar: Second conditional

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Pre-Intermediate by: John and Liz Soars. Oxford University Press	Yes
Recommended Texts	None	
Websites	https://apoyanblog.wordpress.com/wp-content/uploads/2016/09/new-headway-pre-intermediate-students-book.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
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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.

Level Three

Semester five

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Coordination chemistry I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35126		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Rawnaq B. Jimaa	e-mail	Rawnaq@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	phD
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	Five
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. To develop the ability to correlate the chemical and physical properties of elements and their compounds with their positions in the periodic table. 2. To establish the link between theory and laboratory practice by conducting. 3. Predict and explain patterns in shape, structure, bonding, hybridization, formal charge, stability, acidity, basicity, solubility, and reactivity for hydrocarbons, halocarbons, alkenes, dienes, and arenes, by understanding and applying concepts of an organic chemical structure, bonding and stability. 4. students will gain an understanding of the bonding fundamentals for both ionic and covalent compounds, including electronegativities, bond distances and bond energies using MO diagrams and thermodynamic data. predicting geometries of simple molecules
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Relate the molecular structure and Lewis dot notation 2. Calculate formal charge 3. Demonstrate the resonance forms of molecules 4. Explain the molecular geometry with VSEPR theory 5. Calculate bonding energy 6. estimate the symmetry of molecules 7. Categorize the point group of molecules 8. Identify character tables 9. Relate symmetry applications 10. estimate types of chemical bonding 11. Define the chemical bonds 12. Adapt Valence Bond theory to molecule structure 13. Explain the covalent bond with hybridization 14. Adapt the Molecular Orbital theory to molecular structure
Indicative Contents	Indicative content includes the following.

المحتويات الإرشادية	Inorganic chemistry encompasses the compounds - both molecular and extended solids - of everything else in the periodic table, and overlaps with organic chemistry in the area of organometallic chemistry, in which metals are bonded to carbon-containing ligands and molecules
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	An introduction to the chemistry of transition elements, some periodic properties, and oxidation states of transition elements.
Week 2	A historical look at the development of coordination chemistry, chain theory, and Werner coordination theory.
Week 3	Coordination numbers, types of ligands, naming coordination complexes
Week 4	Symmetry in metallic complexes (isomerism).
Week 5	Effective Atomic Number
Week 6	Valence bond theory - Hybridization of atomic orbitals
Week 7	Crystal Field Theory
Week 8	Exam
Week 9	Crystal field stabilization energy for high spinning and low spinning complexes, comparison between valence bond theory and crystal field theory
Week 10	Molecular orbital theory, Orbital symmetry
Week 11	Different preparation methods, substitution reactions in aqueous and anhydrous solvents

	and in the absence of a solvent, thermal dissociation of complexes, redox reactions
Week 12	Mechanical Ligands (SN1, SN2),
Week 13	Homogeneous and heterogeneous catalysts
Week 14	Trans effect, preparation of Cis, and Trans semi synthesis.
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Chromium chemistry / preparation of potassium trisoxalato chromium(III) tri hydrate
Week 2	Lab 2: Iron chemistry / study of the oxidation state of iron Fe^{+2}
Week 3	Lab 3: A study of the oxidation state of ferric Fe^{+3}
Week 4	Lab 4: preparation of complex Potassium Ferric (III) oxalate trihydrate
Week 5	Lab 5: Cobalt chemistry / preparation of a hexaamineCobalt (III) trichloride complex
Week 6	Lab 6: Preparation of nitrito pentaamine complex Cobalt(III) nitrite
Week 7	Lab 7: Nickel chemistry / preparation of the Bisdimethylglyoximatonickel(II) complex
Week 8	Exam
Week 9	Lab 9: Preparation of hexaamine nickel(II) chloride
Week 10	Lab 10: Copper chemistry / preparation of tetraammine copper(II) sulfate monohydrate
Week 11	Lab 11: Preparation of diiodato copper(II)
Week 12	Lab 12: Isomerism in complexes/ Preparation of engineering isomeric complexes (Preparation of a complex trans-potassium bisoxalatedichloro cobalt(III) hydrochloride
Week 13	Lab 13: Preparation of the Cis-potassium bisoxalatodichloro cobalt(III) complex
Week 14	Lab 14: Preparation of the trans-potassium bisoxalatodichlorocopper(II) isomer

Week 15	Exam
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Inorganic chemistry, Catherine E. Housecroft and Alan G. Sharpe, 3rd ed., 2008. Inorganic chemistry, Catherine E. Housecroft and Alan G. Sharpe, 4th ed., 2012.	Yes
Recommended Texts	Inorganic chemistry, James E. Huheey, Ellen A. Keiter and Richard L. Keiter, 4th ed., 1993.	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	Kinetic chemistry 3		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35127		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	5
Administering Department		College	CoS
Module Leader	Maath Azeez Ibrahim	e-mail	m.a.ibraheem@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	5. Physical chemists are focused on understanding the physical properties of atoms and molecules, the way chemical reactions work, and what these properties reveal. Their discoveries are based on understanding chemical properties and describing their behavior using theories of physics and mathematical computations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 15. By interpreting the real gases, the student will be able to solve the problems. 16. describes the ideal and real gases. 17. uses the Van Der Waals gas equation. 18. uses the real gas and Van Der Waals isotherms. 19. describes the critical state, adapts critical state equation to the problems. 20. By interpreting the some properties of liquids and solids, the student will be able to solve the problems. 21. describes the condensed phases. 22. express and uses the vapour pressure. 23. Interpreting the phase equilibrium in simple systems, the student will be able to questions them. 24. express the stability of the phases in the pure substance. 25. interprets the pressure dependence of T-M curve. 26. adapt the Clapeyron equation to the solid-liquid, liquid-gas and solid-gas equilibrium. 27. uses the phase diagrams. 28. expresses the effect of pressure on the vapour pressure. 29. By describing the ideal solution, the student will be able to recognize, use and compare the colligative properties. 30. describe the kinds of solutions. 31. explains the ideal solution and debate the chemical potential in ideal solution. 32. interpret the more than one volatile component: the idealk solution. 33. recognizes the binary solutions. 34. uses the Lever rule for two pahase regions. 35. relates the fractional distillation and azeotropes. 36. debate the equilibrium in non-ideal systems. 37. defines the activity. 38. adapts the colligatives properties on non-ideal systems. 39. expresses the activity in the electrolytic solutions.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Physical chemistry - Gases chemistry - Thermodynamics - Kinetics chemistry
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Kinetic molecular theory of gases
Week 2	Molecular velocity distribution
Week 3	Maxwell-Boltzmann distribution
Week 4	The principle of equal distribution of energies
Week 5	Photochemistry regions of the spectrum
Week 6	The rules of photochemistry
Week 7	Exam
Week 8	Selectivity of the two photochemical reactions
Week 9	Molecular orbitals and types of electron transitions
Week 10	spin, single and triple cases
Week 11	Picking rules

Week 12	Types of transfers prohibited and allowed
Week 13	Potential energy curves of molecules
Week 14	electronic spectra
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction and general instructions in laboratory safety and safety precautions
Week 2	Find the decomposition constant of methyl acetate in an acidic environment
Week 3	Find the decomposition constant of ethyl acetate in an acidic environment
Week 4	Hydrolysis of methyl acetate by sodium hydroxide in equal concentrations
Week 5	Hydrolysis of ethyl acetate by sodium hydroxide in equal concentrations
Week 6	Hydrolysis of methyl acetate by sodium hydroxide in unequal concentrations
Week 7	Exam
Week 8	Hydrolysis of ethyl acetate by sodium hydroxide in unequal concentrations
Week 9	The reaction of acetone with iodine in the presence of acid as a catalyst
Week 10	Determine the molecular weight of the polymer (PVA) from viscosity measurements
Week 11	Determine the molecular weight of the polymer (PVC) from viscosity measurements
Week 12	Determination of the reaction order and rate constant for the reaction of the sulfite radical with the iodate ion radical (clock reaction)
Week 13	
Week 14	
Week 15	Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Physical chemistry Transition properties of gases and kinetic chemistry	Yes
Recommended Texts	1- Physical chemistry by Dr. Ali Abdul-Hussein and Dr. Safaa Saleh Al-Omar, University of Basra 2- Physical Chemistry of Dr. Muslim Abdel Mohamed 3- Thermodynamics and Photochemistry by Dr. Jalal Mohamed Salih and Dr. Basil Hashem	Yes
Websites	www.byPhysical Chemistry Books Adwww.scienceforums.com/forum/chemistrtoco.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Organic chemistry III		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35128		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Luma Salman Abd	e-mail	Luma_salman@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Organic Chemistry 2	Semester	Four
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	6. The course aims is not only the continuation study of basic principles of organic chemistry, but it will also provide the important topics in Organic chemistry functional groups including, carbonyl compound aldehydes & ketones, , α, β – unsaturated carbonyl compounds , ester enolate synthesis, carboxylic acids and its derivatives). This helps students to gain experience to predict the functional group transformations, simple reaction mechanisms, and the synthesis of organic molecules by multi-step synthesis strategies. In addition of that, the course will also help students to understand the reaction mechanism subjects in later stages of their study. 7. The general concept of the practical part of this course is to train students the fundamental laboratory skills. This includes the practical work of extraction, purification and separation techniques with some simple organic preparations which are required for experimental chemistry. 8. During the practical course you should acquire skills to observe and record scientific experiments. In addition, you familiarize yourself with the laboratory equipments, various chemicals, and set up a chemical reactions to ensure safe and diligent laboratory practice.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. The chemistry of the carbonyl group is the single most important aspect of organic chemical reactivity . Its central theme is a fundamental reaction type, nucleophilic addition to carbonyl groups • The principles of nucleophilic addition to aldehyde and ketone developed in hear will be seen to have broad applicability when transformation of various derivatives of carboxylic acid • Class of compounds that contain the carbonyl group include many derived from carboxylic acids (acyl chloride , acid anhydride , ester, and amide) as well as the two related classes aldehyde and ketone • Carbonyl group can affect the chemical properties of aldehydes and ketones in other ways, in which the enol , rather than the aldhyde or ketone is the reactive species and that this property can be used to advantage as a method for carbon –carbon bond formation • There is also an important group of reaction in which the carbonyl group acts as a powerful electron-withdrawing substituent , increasing the acidity of protone on the adjacent carbons • α, β – unsaturated carbonyl compounds have some interesting properties that result from conjugated of the carbon-carbon double bond with the carbonyl group the π system of the carbon-carbon and carbon-oxygen double bond overlap to form extended π system that permits increased electron delocalization. This electron delocalization stabilize a conjugated system • Extend our study of carbanion to the enolate ions derived from ester (ester

	enolates) are important reagent in synthesis organic chemistry the stabilized enolates derived from β-keto ester are particularly useful
	• Keto ester , which are useful reagent for a number of carbon- carbon bond forming reaction • The importance of carboxylic acids is magnified when we realize that they are the parent compounds of large group of derivative that includes acyl chloride, acid anhydride, ester , amide and nitriles . • Illustrates preparation methods of aldehyde and ketone, carboxylic acid and its derivatives.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Carbonyl compounds - aldehydes and ketones, with their enol isomer - α, β – unsaturated carbonyl compounds , - ester enolate synthesis - carboxylic acids with dicarboxylic acids - carboxylic acids derivatives -

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري/	
	Material Covered
Week 1	Introduction to carbonyl compounds with nomenclature and Properties of aldehydes and ketones
Week 2	Aldehydes and ketones reactions
Week 3	Methods for preparing aldehydes and ketones

Week 4	Reaction of aldehyde and ketones that involved enol or enolate ion intermediates
Week 5	Reaction of aldehyde and ketones that involved enol or enolate ion intermediates
Week 6	Addition of carbanions to α - β unsaturated ketone the Michael reaction ,
Week 7	Ester enolate synthesis Preparation of β -keto Ester
Week 8	Exam
Week 9	The malonic ester synthesis
Week 10	Carboxylic acids and Dicarboxylic acid nomenclature and (Chemical reactions)
Week 11	Carboxylic acid and Dicarboxylic acids, (methods of preparation)
Week 12	Carboxylic acid derivatives nomenclature and its interactions
Week 13	Methods for preparing carboxylic acid derivatives
Week 14	Preparation of nitriles
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	An introduction to carbonyl compounds/methods of preparation
Week 2	
Week 3	Carbonyl reactions
Week 4	Carbonyl reagents (Brady reagent and Tollen reagent)
Week 5	Preparation of organic compounds by refluxing process
Week 6	Preparation of carboxylic acid by Cannizzaro condensation method
Week 7	Converting a carboxylic acid to an ester

Week 8	Exam
Week 9	Preparation of Soap
Week 10	Preparation of toothpaste
Week 11	Aldol condensation
Week 12	An introduction to amines
Week 13	Preparation Schiff bases
Week 14	Preparation of imides
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		Yes
Recommended Texts	Experimental Organic Chemistry by: Joaquín Isac-García, José A. Dobado, Francisco G. Calvo-Flores and Henar Martínez-García EXPERIMENTAL ORGANIC CHEMISTRY by SONIA RATNANI and SHRINI WAS GURJAR	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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 1		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35129		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level		Semester of Delivery	
Administering Department		College	COS
Module Leader	Ekhlas Abdallah Hassan	e-mail	ekhlasabdullah@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor Doctor	Module Leader's Qualification	PH.D
Module Tutor	Theory Lecture	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Cytology	Semester	5

Co-requisites module		Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	9. Understand how the chemical properties of molecules determine the ways in which they interact and react with each other. 10. Understand different types of chemical reactions and how they are used by living organisms 11. Biochemistry is the study of chemical processes in living organisms. Biochemistry governs all living organisms and living processes. By controlling information flow through biochemical signalling and the flow of chemical energy through metabolism, biochemical processes give rise to the incredible complexity of life
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 40. Students completing the biochemistry major should: Be able to frame a scientific question or problem. Be able to undertake investigations and perform analyses that provide information about biochemical questions. 41. Be able to undertake investigations and perform analyses that provide information about biochemical questions and help to solve biochemical problems. 42. Identify functions of cells, organs and different systems in living organisms and their metabolic machinery. 43. Describe the fundamental biochemical principals including the structure/function of biomolecules, metabolic pathways along with their regulatory processes and metabolic disorders. 44. Outline different analytical techniques and proper procedures/regulations for safe handling and use of chemicals, and practice safe laboratory procedure. 45. State a comprehensive understanding of the theory and practice of modern instrumentation and applied to appropriate biochemical problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Biochemistry - Carbohydrates - Lipids - Amino acids

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

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

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

assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Introduction to biochemistry
Week 2	Life molecules and living cells
Week 3	water and solutions
Week 4	Carbohydrates
Week 5	Monosaccharides
Week 6	Single carbohydrate interactions and the most important types
Week 7	compound sugars
Week 8	Exam
Week 9	Lipids
Week 10	Complement reactions and detection of alkenes
Week 11	Simple fats Triglycerides, fats and oils, fatty acids, phospholipids
Week 12	Sphenolic fats, steroidal fats, cholesterol and terpenes
Week 13	Amino acids
Week 14	Peptides
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1	Classification of cabohydrates
Week 2	Molisch test
Week 3	Selfanof test
Week 4	Di saccharides test
Week 5	Penidect test
Week 6	Beal test
Week 7	Iodine test
Week 8	Exam
Week 9	Lipids
Week 10	Copper acetate
Week 11	Cholesterol test
Week 12	Salkoveski test
Week 13	pH value
Week 14	Acrolin test
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Modern Biological Chemistry \ Dr. Riyad Rashid Suleiman 2- Biochemistry \ Dr. Sami Al-Mudhaffar 3- Al-Wajeez in Biological Chemistry \ d. Qusai Chalabi	Yes
Recommended	1- Harpers Review of Biochemistry, 2- Principle of Bio Chemistry, Smith & White	Yes

Texts	3- Biochemistry by Armstrong	
Websites	www.bytocho.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Industrial Chemistry I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35130		
ECTS Credits	4.00		
SWL (hr/sem)	100		
Module Level		Semester of Delivery	
Administering Department		College	COS
Module Leader	Noor Sabah Ahmed	e-mail	noorsabah@uodiyala.edu.iq
Module Leader's Acad. Title		Assistant Professor Doctor	Module Leader's Qualification Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	12. make the students well-grounded in the principles and through knowledge of scientific techniques of industrial Chemistry. 13. Educate and train Chemists to acquire a meaningful picture of Chemical industries. 14. prepare students for professional participation in Chemical industries so as to adapt themselves to jobs which are problem solving 15. train students to be result-oriented in the chemical, petrochemical, biochemical and allied technological fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Knowledge and understanding Knowledge of the main laws and the main concepts of thermodynamics and reaction kinetics applied to process engineering. 2. Knowledge of principles of chemical reactor and process control. Knowledge of the principles of catalysis and chemical reactions involved in the main industrial productions. Understanding of the environmental impact and critical points of the plants taken into consideration. 3. Ability to apply knowledge and understanding Knowing how to solve theoretical and practical problems concerning the choice, the sizing of an industrial reactor. Knowing how to create and organize a collection of experimental data related to reaction kinetics. Knowing how to synthesize and characterize a homogeneous or heterogeneous catalyst. Choose the best reactor and process conditions for sustainable processes. 4. Judgment skills Know how to evaluate and recognize the type of process used in the industrial production of a given product. Recognize the characteristics of the plant and the integration of the same in an industrial chemical pole also with reference to the environmental impact and the sustainability of the process. Being able to recognize errors through a critical analysis of the process. 5. Communication skills Knowing how to communicate the knowledge learned and the result of their application using appropriate terminology, both oral and written. Knowing how to interact with the teacher and with the classmates, also with a view to joining a team. 6. Learning skills Knowing how to take notes, selecting and collecting information according to their importance and priority. Being able to be sufficiently autonomous in the application and in the critical evaluation of the themes proposed in the theoretical part.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Industrial chemistry - Corrosion of metals - Energy sources - Cement industrial - Glass industrial - paper Industrial - Detergent industrial - Adsorption process - Absorption process
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري/	
	Material Covered
Week 1	Historical introduction - branches of chemistry -Kinds of chemical industries-Principles of the chemical industry
Week 2	Definitions and important information in Chemical industry
Week 3	industries economy chemical
Week 4	Basis for selecting interactions Chemical and transfer technology to industrial level
Week 5	Physical processes in industries Chemical and separation methods

Week 6	Industrial Units / Distillation Process
Week 7	chemosorption process
Week 8	Exam
Week 9	Adsorption process
Week 10	extraction process
Week 11	Filtration process
Week 12	Chemical reactions and reactors chemical
Week 13	catalysts in Chemical industry
Week 14	Calculation of material balance in industry chemical
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	-Foundations and applications in industrial chemistry / uthored by Dr. Latif Hamid Ali / University of Mosul	Yes
Recommended Texts	1- Foundations of Industrial Chemistry / Written by Dr. Aziz Ahmed Amin 2- Electrochemical Technology / Written by Dr. Ibrahim Salem Mansour 3- Industrial Chemistry / Written by Dr. Corgis Abdel Adam	Yes
Websites	www.bytoco.com	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Optional I (Environmental pollution)		Module Delivery
Module Type	B		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-35031		
ECTS Credits	2.00		
SWL (hr/sem)	50		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department	DOC	College	COS
Module Leader	Wafaa shamkhi Jabor	e-mail	wafaashamkhi@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	16. To be able to describe what pollution is. 17. To be able to know the different types of pollution. 18. To be able to list the sources and the effects for the different types of pollution. 19. define pollution. explain the sources of pollution. discuss and describe types of pollution
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 7. Students will learn how to assess pollution sources, study exposure pathways and fate. 8. Evaluate consequences of human exposure to pollution and its impacts to environmental quality. 9. Be able to clearly and concisely speak about and write about the relationships between increase pollution levels and general health. Then, writing proposals (as a presentation) for issuing industrial permits for projects compliant with international standards to combat environmental pollution while stopping industrial activity and applying deterrent penalties for violating factories. 10. Learn how to study local sever cases and write report to solve the effect of pollution effects. Then, write about the recommended methods to replace pollutants by using alternative material and recent techniques, such as 1- Usage bioinsecticides and biological control instead of traditional insecticides. 2- Relying on renewable energy sources (solar, wind energy) and other alternative energysources instead of traditional 11. 1.7 Draw a statistical curves or histograms to indicate pollutant levels, their effects of them on human population and human activities in local of the surrounding regions. 12. Comprehend the methods and applications to measure or detect pollutants, economic and health hazards. Then, write the recommended methods to improve air and water sources, moreover, to prevent hazards on human health, livestock production and economic loss. 13. Enumerate the national and international data deal with environmental pollution. Then, write the recommended methods to use non-polluting sources of energy to the environment
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Environmental pollution

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	32	Structured SWL (h/w)	2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	18	Unstructured SWL (h/w)	1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	50		
الحمل الدراسي الكلي للطالب خلال الفصل			
Module Evaluation			
تقييم المادة الدراسية			

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0	Continuous	All
	Report	0	0		LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr (2 exams)	25% (25)	7- 15	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Introduction and general guidance on safety precautions
Week 2	Introduction to Ecology
Week 3	Water pollution
Week 4	Water analyzes
Week 5	Oil pollution
Week 6	Radioactive
Week 7	Elements Climate change
Week 8	Exam
Week 9	Heavy Metals
Week 10	Air Pollution
Week 11	Uranium
Week 12	Radioactive pollution

Week 13	Soil pollution
Week 14	Green buildings and their role in reducing environmental pollution
Week 15	Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		Yes
Recommended Texts	4-	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.				

Level Three

Semester Six

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Coordination Chemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-36132		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Rawnaq Bahman Jimaa	e-mail	Rawnaq@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Inorganic chemistry 4	Semester	Four
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. To develop the ability to correlate the chemical and physical properties of elements and their compounds with their positions in the periodic table. 2. To establish the link between theory and laboratory practice by conducting. 3. Predict and explain patterns in shape, structure, bonding, hybridization, formal charge, stability, acidity, basicity, solubility, and reactivity for hydrocarbons, halocarbons, alkenes, dienes, and arenes, by understanding and applying concepts of organic chemical structure and bonding and stability. 4. students will gain an understanding of: the bonding fundamentals for both ionic and covalent compounds, including electronegativities, bond distances and bond energies using MO diagrams and thermodynamic data. predicting geometries of simple molecules
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Relate the molecular structure and Lewis dot notation 2. Calculate formal charge 3. Demonstrate the resonance forms of molecules 4. Explain the molecular geometry with VSEPR theory 5. Calculate bonding energy 6. estimate the symmetry of molecules 7. Categorize the point group of molecules 8. Identify character tables 9. Relate symmetry applications 10. estimate types of chemical bonding 11. Define the chemical bonds 12. Adapt Valence Bond theory to molecule structure 13. Explain the covalent bond with hybridization 14. Adapt the Molecular Orbital theory to molecular structure
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Inorganic chemistry encompasses the compounds - both molecular and extended solids - of everything else in the periodic table, and overlaps with organic chemistry in the area of organometallic chemistry, in which metals are bonded to carbon-

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Magnetic properties of coordination complexes
Week 2	Spectral properties of coordination complexes
Week 3	Kinetic stability and thermodynamic stability
Week 4	Calculate the stability constants of coordination complexes and the factors affecting them
Week 5	Labile and inert complexes
Week 6	A comparative study of the elements of the three transitional chains
Week 7	Exam
Week 8	Chemistry of Carbonyl compounds (preparation)
Week 9	The chemistry of carbonyls (interactions and properties)
Week 10	Introduction to the organometallic compounds
Week 11	Preparation of organometallic complexes and their reactions
Week 12	Properties of organometallic complexes

Week 13	Introduction to the chemistry of internal transition elements (Lanthanides and actinides)
Week 14	Comparison between the lanthanides and transition elements
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Aluminum chemistry/preparation of Bisoxalato aluminum(III) trihydrate complex
Week 2	Lab 2: Preparation of ligand isomeric complexes/ preparation of pentaaminechlorocobalt (III) dichloride complex
Week 3	Lab 3: Preparation of the pentaamine nitrito cobalt(III) complex
Week 4	Lab 4: Hard and soft acids and bases / Preparation of Trithioureacopper(I) complex
Week 5	Lab 5: Preparation of Trithiourea lead(II) complex
Week 6	Lab 6: Preparation of pentaamminenitratocobalt(III)dinitrate
Week 7	Lab 7: Preparation of pentathioureacopper(I) chloride
Week 8	Exam
Week 9	Lab 9: preparation of pentathioureadicopper(I) nitrate
Week 10	Lab 10: Study the chemistry of vanadium
Week 11	Lab 11: Preparation of Ammonium oxobisoxalato vanadyl (IV) hydrate
Week 12	Lab 12: Potassium Tetracyanoplatinate(II) Bromide trihydrate
Week 13	Lab 13: Pentacarbonyl(thiourea)chromium(0)
Week 14	Lab 14: Stereoisomerisms/preparation of Potassium Tricarbonatocobaltate(III) in Solution
Week 15	Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Inorganic chemistry, Catherine E. Housecroft and Alan G. Sharpe, 3rd ed., 2008.	Yes
	Inorganic chemistry, Catherine E. Housecroft and Alan G. Sharpe, 4th ed., 2012.	
Recommended Texts	Inorganic chemistry, James E. Huheey, Ellen A. Keiter and Richard L. Keiter, 4th ed., 1993.	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	Electrochemistry		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-36133		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Maath Azeez Ibrahim	e-mail	m.a.ibraheem@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-313	Semester	five
Co-requisites module		Semester	

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

Module Objectives أهداف المادة الدراسية	5. Physical chemists are focused on understanding the physical properties of atoms and molecules, the way chemical reactions work, and what these properties reveal. Their discoveries are based on understanding chemical properties and describing their behavior using theories of physics and mathematical computations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 15. By interpreting the real gases, the student will be able to solve the problems. 16. describes the ideal and real gases. 17. uses the Van Der Waals gas equation. 18. uses the real gas and Van Der Waals isotherms. 19. describes the critical state, adapts critical state equation to the problems. 20. By interpreting the some properties of liquids and solids, the student will be able to solve the problems. 21. describes the condensed phases. 22. express and uses the vapour pressure. 23. Interpreting the phase equilibrium in simple systems, the student will be able to questions them. 24. express the stability of the phases in the pure substance. 25. interprets the pressure dependence of T-M curve. 26. adapt the Clapeyron equation to the solid-liquid, liquid-gas and solid-gas equilibrium. 27. uses the phase diagrams. 28. expresses the effect of pressure on the vapour pressure. 29. By describing the ideal solution, the student will be able to recognize, use and compare the colligative properties. 30. describe the kinds of solutions. 31. explains the ideal solution and debate the chemical potential in ideal solution. 32. interpret the more than one volatile component: the idealk solution. 33. recognizes the binary solutions. 34. uses the Lever rule for two pahase regions. 35. relates the fractional distillation and azeotropes. 36. debate the equilibrium in non-ideal systems. 37. defines the activity. 38. adapts the colligatives properties on non-ideal systems. 39. expresses the activity in the electrolytic solutions.
Indicative Contents	Indicative content includes the following.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Frank Conden's rule and Belonsky diagram
Week 2	Photosensitization and the lifespan of the irritant condition
Week 3	Quantum yield of phosphorylation and fluorescence
Week 4	The kinetics of chemical reactions
Week 5	The rate of a chemical reaction
Week 6	The degree of reactivity and molecular numericality
Week 7	Exam
Week 8	Derivation of differential and integral velocity equations
Week 9	Determine the degree of reaction and half-life
Week 10	Effective complex theory and collision theory
Week 11	Electrolytic conductivity
Week 12	Electrolytic dissociation constant
Week 13	Cell interactions and types of gas electrodes

Week 14	Electrode potential and oxidation-reduction systems
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Finding the solubility product of a sparsely soluble salt by electrical conduction method
Week 2	Finding the rate constant for the saponification of ethyl acetate by electrical conduction method
Week 3	Measurement of electrical conductivity of strong electrolytes
Week 4	Conductive demineralization between a strong acid and a strong base.
Week 5	The effect of salt as a catalyst in changing the reaction rate
Week 6	Beer-Lambert's law validity test
Week 7	Exam
Week 8	Determination of the reaction rate of iodine with cyclohexanone
Week 9	Electrical conductivity and finding the weak electrolyte dissociation constant
Week 10	Finding the critical concentration of micelles by electrical conductivity
Week 11	Finding the critical concentration of micelles by spectroscopy
Week 12	
Week 13	
Week 14	
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Physical chemistry Transition properties of gases and kinetic chemistry	Yes
Recommended Texts	1- Physical chemistry by Dr. Ali Abdul-Hussein and Dr. Safaa Saleh Al-Omar, University of Basra 2- Physical Chemistry of Dr. Muslim Abdel Mohamed 3- Thermodynamics and Photochemistry by Dr. Jalal Mohamed Salih and Dr. Basil Hashem	yes
Websites	www.byPhysical Chemistry Books Adwww.scienceforums.com/forum/chemistrto.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Organic chemistry IV		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-36134		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Luma Salman Abd	e-mail	Luma_salman@uodiyala.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Organic chemistry 3	Semester	Five
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents
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Module Objectives أهداف المادة الدراسية	- The course aims is not only the continuation study of basic principles of organic chemistry, but it will also provide the important topics in Organic chemistry functional groups including, carbonyl compound aldehydes & ketones, , α, β – unsaturated carbonyl compounds , ester enolate synthesis, carboxylic acids and its derivatives). This helps students to gain experience to predict the functional group transformations, simple reaction mechanisms, and the synthesis of organic molecules by multi-step synthesis strategies. In addition of that, the course will also help students to understand the reaction mechanism subjects in later stages of their study. - The general concept of the practical part of this course is to train students the fundamental laboratory skills. This includes the practical work of extraction, purification and separation techniques with some simple organic preparations which are required for experimental chemistry. - During the practical course you should acquire skills to observe and record scientific experiments. In addition, you familiarize yourself with the laboratory equipments, various chemicals, and set up a chemical reactions to ensure safe and diligent laboratory practice.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. The chemistry of the carbonyl group is the single most important aspect of organic chemical reactivity . Its central theme is a fundamental reaction type, nucleophilic addition to carbonyl groups - The principles of nucleophilic addition to aldehyde and ketone developed in hear will be seen to have broad applicability when transformation of various derivatives of carboxylic acid - Class of compounds that contain the carbonyl group include many derived from carboxylic acids (acyl chloride , acid anhydride , ester, and amide) as well as the two related classes aldehyde and ketone - Carbonyl group can affect the chemical properties of aldehydes and ketones in other ways, in which the enol , rather than the aldhyde or ketone is the reactive species and that this property can be used to advantage as a method for carbon –carbon bond formation - There is also an important group of reaction in which the carbonyl group acts as a powerful electron-withdrawing substituent , increasing the acidity of protone on the adjacent carbons α, β – unsaturated carbonyl compounds have some interesting properties that result from conjugated of the carbon-carbon double bond with the carbonyl group the π system of the carbon-carbon and carbon-oxygen double bond overlap to form extended π system that permits increased electron delocalization. This electron delocalization stabilize a conjugated system - Extend our study of carbanion to the enolate ions derived from ester (ester enolates) are important reagent in synthesis organic chemistry the

	stabilized enolates derived from β-keto ester are particularly useful • Keto ester , which are useful reagent for a number of carbon- carbon bond forming reaction • The importance of carboxylic acids is magnified when we realize that they are the parent compounds of large group of derivative that includes acyl chloride, acid anhydride, ester , amide and nitriles . • Illustrates preparation methods of aldehyde and ketone, carboxylic acid and its derivatives.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Carbonyl compounds - aldehydes and ketones, with their enol isomer - α, β – unsaturated carbonyl compounds , - ester enolate synthesis - carboxylic acids with dicarboxylic acids - carboxylic acids derivatives -

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem)	150		

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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري/	
	Material Covered
Week 1	Additional important information about carboxylic acid derivatives
Week 2	An introduction to stereochemistry of isomers
Week 3	Types of isomers / their properties and applications of stereochemistry in reactions
Week 4	Aryl halides nomenclature and their physical properties
Week 5	Aryl halides: their chemical reactions and application in the Diels Alder reaction
Week 6	Aryl halides: Methods for their preparation
Week 7	Ester inoleate and its applications
Week 8	Exam

Week 9	Unsaturated carbonyl compounds of the alpha-beta type
Week 10	Amines and their physical properties
Week 11	Preparation of amines
Week 12	Amines: their chemical reactions
Week 13	An introduction to the chemistry of heterocycles
Week 14	Phenols, their physical properties, chemical reactions, preparation of phenols
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	An introduction to diazonium salts, their preparation and interactions
Week 2	Preparation of azo dye from diazonium salts
Week 3	Azo dye reduction
Week 4	Preparation of benzene iodide
Week 5	Preparation of acetanilide
Week 6	Preparation of aniline (nitrobenzene reduction)
Week 7	Exam
Week 8	Preparation of Para Nitro Acetanilide
Week 9	Hydrolysis of Para-Nitro acetanilide
Week 10	Preparation of Para-bromo acetanilide
Week 11	Hydrolysis of Para-bromo acetanilide
Week 12	Preparation of para-aminophenol
Week 13	Preparation of Phthalamide

Week 14	Preparation of anthranilic acid from phthalamides
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts	Experimental Organic Chemistry by: Joaquín Isac-García, José A. Dobado, Francisco G. Calvo-Flores and Henar Martínez-García EXPERIMENTAL ORGANIC CHEMISTRY by SONIA RATNANI and SHRINIWAS GURJAR	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	Biochemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-36135		
ECTS Credits	6.00		
SWL (hr/sem)	150		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Ekhlas Abdallah Hassan	e-mail	ekhlasabdullah@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor Doctor	Module Leader's Qualification	PH.D
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Biochemistry 1	Semester	Five
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	9. Understand how the chemical properties of molecules determine the ways in which they interact and react with each other. 10. Understand different types of chemical reactions and how they are used by living organisms 11. Biochemistry is the study of chemical processes in living organisms. Biochemistry governs all living organisms and living processes. By controlling information flow through biochemical signalling and the flow of chemical energy through metabolism, biochemical processes give rise to the incredible complexity of life
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 40. Students completing the biochemistry major should: Be able to frame a scientific question or problem. Be able to undertake investigations and perform analyses that provide information about biochemical questions. 41. Be able to undertake investigations and perform analyses that provide information about biochemical questions and help to solve biochemical problems. 42. Identify functions of cells, organs and different systems in living organisms and their metabolic machinery. 43. Describe the fundamental biochemical principals including the structure/function of biomolecules, metabolic pathways along with their regulatory processes and metabolic disorders. 44. Outline different analytical techniques and proper procedures/regulations for safe handling and use of chemicals, and practice safe laboratory procedure. 45. State a comprehensive understanding of the theory and practice of modern instrumentation and applied to appropriate biochemical problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - PROTEIN - Nucleic acid - Enzymes - Vitamin - Hormones

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	7	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	7	10% (10)	Continuous	All
	Report	4	10% (10)	13	LO #5, #8 and #10
Summative	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري /

	Material Covered
Week 1	Peptides: number, type and sequence of amino acids for peptides, separation and characterization of amino acids for peptides
Week 2	Proteins: proteins structure, classification, plasma proteins, changes in the general characteristics of proteins.
Week 3	Nucleotides and nitrogenous bases: Nucleotides, their structure and general properties, and their functions, nitrogenous bases.
Week 4	Nucleic acids: nucleosides, nucleotides and nucleic acids
Week 5	Nucleic acids: their structure and general properties
Week 6	Enzymes: Enzymes and their importance, structure and general properties
Week 7	Enzymes: Classification of enzymes, their function as catalysts and the factors affecting them
Week 8	Exam
Week 9	Enzymes: Michaelis-Menten equation, Lineweaver-Burke equation
Week 10	Enzymes: Inhibiting enzymes, regulating the work of enzymes, and regulating enzymes
Week 11	Vitamins: its importance, composition, classification, types, characteristics and life roles
Week 12	Vitamins: their properties and life roles
Week 13	Hormones: their composition, classification, types, and the glands that secrete them
Week 14	Hormones: their characteristics and life roles
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Amino acid
Week 2	Ninhydrine test
Week 3	Xantho protic test
Week 4	Hopkins-coll test
Week 5	Pauly test
Week 6	Sacakoji test
Week 7	Proteins
Week 8	Exam
Week 9	Biuret test
Week 10	Solubility test
Week 11	Denaturation
Week 12	Enzymes
Week 13	Acid value
Week 14	Lead acetate test
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Modern Biological Chemistry \ Dr. Riyad Rashid Suleiman 2- Biochemistry \ Dr. Sami Al-Mudhaffar	Yes

	3- Al-Wajeez in Biological Chemistry \ d. Qusai Chalabi	
Recommended Texts	1- Harpers Review of Biochemistry, 2- Principle of Bio Chemistry, Smith & White 3- Biochemistry by Armstrong	yes
Websites	www.bytocho.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Industrial Chemistry II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-326		
ECTS Credits	4.00		
SWL (hr/sem)	100		
Module Level	UGx11 1	Semester of Delivery	1
Administering Department		College	COS
Module Leader	Noor Sabah Ahmed	e-mail	noorsabah@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor Doctor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Omar Ghazi Hammoodi	e-mail	omerkazi@uodiyala.edu.iq
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Che-316	Semester	five
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	make the students well-grounded in the principles and through knowledge of scientific techniques of industrial Chemistry. Educate and train Chemists to acquire a meaningful picture of Chemical industries. prepare students for professional participation in Chemical industries so as to adapt themselves to jobs which are problem solving train students to be result-oriented in the chemical, petrochemical, biochemical and allied technological fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. Knowledge and understanding Knowledge of the main laws and the main concepts of thermodynamics and reaction kinetics applied to process engineering. Knowledge of principles of chemical reactor and process control. Knowledge of the principles of catalysis and chemical reactions involved in the main industrial productions. Understanding of the environmental impact and critical points of the plants taken into consideration. Ability to apply knowledge and understanding Knowing how to solve theoretical and practical problems concerning the choice, the sizing of an industrial reactor. Knowing how to create and organize a collection of experimental data related to reaction kinetics. Knowing how to synthesize and characterize a homogeneous or heterogeneous catalyst. Choose the best reactor and process conditions for sustainable processes. Judgment skills Know how to evaluate and recognize the type of process used in the industrial production of a given product. Recognize the characteristics of the plant and the integration of the same in an industrial chemical pole also with reference to the environmental impact and the sustainability of the process. Being able to recognize errors through a critical analysis of the process. Communication skills Knowing how to communicate the knowledge learned and the result of their application using appropriate terminology, both oral and written. Knowing how to interact with the teacher and with the classmates, also with a view to joining a team. Learning skills Knowing how to take notes, selecting and collecting information according to their importance and priority. Being able to be sufficiently autonomous in the application and in the critical evaluation of the themes proposed in the theoretical part.
Indicative Contents	Indicative content includes the following.

المحتويات الإرشادية	- Industrial chemistry - Corrosion of metals - Energy sources - Cement industrial - Glass industrial - paper Industrial - Detergent industrial - Adsorption process - Absorption process
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري /	
	Material Covered
Week 1	Material balance calculations in combustion processes
Week 2	Fuel and energy / oil / gas
Week 3	Nuclear Energy
Week 4	Solar energy
Week 5	Water and its uses in the chemical industry
Week 6	Water treatment - domestic and industrial
Week 7	Pollution / air pollution
Week 8	Pollution of water and land
Week 9	Exam

Week 10	Corrosion
Week 11	Cement industry
Week 12	Glass industry
Week 13	Soap industry
Week 14	Paper Industry
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	-Foundations and applications in industrial chemistry / uthored by Dr. Latif Hamid Ali / University of Mosul	Yes
Recommended Texts	1- Foundations of Industrial Chemistry / Written by Dr. Aziz Ahmed Amin 2- Electrochemical Technology / Written by Dr. Ibrahim Salem Mansour 3- Industrial Chemistry / Written by Dr. Corgis Abdel Adam	Yes
Websites	www.bytoco.com	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Optional II		Module Delivery
Module Type	B		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Che-36037		
ECTS Credits	2.00		
SWL (hr/sem)	50		
Module Level		Semester of Delivery	
Administering Department		College	
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري/	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Exam
Week 9	

Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (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.

Fourth

1st semester

First course

Course Description Form

1. Course Name:	
Metabolic chemistry 1	
2. Course Code:	
Che-4739	
3. Semester / Year:	
Semester 1	
4. Description Preparation Date:	
10/ 9 / 2025	
5. Available Attendance Forms:	
Weekly / obligatory(mandatory)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
75 hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Khalid Shaalan Sahab Email: Khalidshalaan@yahoo.com	
8. Course Objectives	
Course Objectives	- Define the metabolism and its importance - Biosynthesis of molecules of cells - Catabolism of dietary molecules to liberate the energy - Define the fates of molecules (clinical importance) that produced from metabolism - Knowledge the chemistry of blood - Define the determination methods used to estimate the blood molecules and its applications - Teaching and learning the students any essential and necessary information related to biochemistry.
9. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and biochemical analysis - Homework that requires subjective explanations in causal ways

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	- Bioenergy - Introduction to metabolism	Bioenergy Introduction to metabolism	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	5	- Digestion and absorption of dietary carbohydrate - Catabolism of glucose - Fate of absorbed glucose/ glycolysis and formation of pyruvate	Digestion and absorption of dietary carbohydrate	=	=
3	5	- Catabolism of glucose - Conversion of pyruvate to acetyl-CoA/ Krebs cycle - Energy calculation from catabolism of glucose	Catabolism of glucose Explain Krebs cycle Energy calculation from catabolism of glucose	=	=
4	5	- Conversion of pyruvate to lactate and Cori cycle - Catabolism of fructose - Catabolism of galactose	- Cori cycle -Catabolism of fructose and galactose	=	=
5	5	- Glycogenesis and glycogenolysis - Gluconeogenesis	Glycogenesis, glycogenolysis and Gluconeogenesis	=	=
6	5	- Pentose phosphate pathway - Glucouronate cycle - Disorder of carbohydrate metabolism	Pentose phosphate pathway and Glucouron cycle	=	=
7	5	First exam of first course		=	=
8		- Digestion and absorption of dietary lipids - Beta-oxidation of fatty acids	Digestion and absorption of dietary lipids Beta-oxidation of fatty acids		
9	5	- Energy from oxidation of fatty acids - Fatty acids Biosynthesis	Energy from oxidation of fatty acids Fatty acids Biosynthesis	=	=
10	5	Biosynthesis of - Triglycerides and phospholipids	Biosynthesis of Triacylglycerol and phospholipids	=	=
11	5	- Biosynthesis of	Biosynthesis of	=	=

		cholesterol - Ketone bodies Disorder of lipids metabolism	cholesterol Ketone bodies		
12	5	- Digestion and absorption of dietary proteins/ Oxidative-degradation States of amino acids	Digestion of dietary proteins and absorption amino acids/ -Oxidative-degradation State of amino acids	=	=
13	5	- Transformation of amino group in liver - Glutamine and alanine transfer amino group from extra-hepatic cells to liver	- Transformation of amino group in liver - transferring amino group from extra-hepatic cells to liver	=	=
14	5	- Excretion methods of nitrogen - Urea cycle and Krebs cycle - aspartate-argininosuccinate shunt - Genetic defects related to protein metabolism and of urea cycle enzymes	- Excretion methods of nitrogen -Urea cycle and Krebs cycle Genetic defects related to protein metabolism and urea cycle enzymes	=	=
15	5	Second exam of first course		=	=

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1- Harpers Illustrated Biochemistry, 2- Principle of Bio Chemistry, Smith & White 3- Biochemistry by Armstrong 4-Lehninger Principle of Bio Chemistry
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

First course

Course Description Form

13. Course Name:	
Spectroscopic analysis	
14. Course Code:	
Che-4738	
15. Semester / Year:	
Semester 1	
16. Description Preparation Date:	
10/ 9 / 2025	
17. Available Attendance Forms:	
Weekly / obligatory (mandatory)	
18. Number of Credit Hours (Total) / Number of Units (Total)	
75 hours	
19. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Sahar Raihan Fadhel Email: saharraihan@uodiyala.edu.iq	
20. Course Objectives	
Course Objectives	- Understand Electromagnetic Radiation (EMR) Interactions: Grasp how matter absorbs, emits, or scatters light across different regions of the electromagnetic spectrum. - Learn the underlying physical mechanisms for transitions—electronic transitions in UV/Vis, vibrational and rotational modes in IR - Predict and calculate analyte concentration and absorbance using fundamental equations such as the Beer-Lambert Law. - Ultraviolet-Visible (UV/Vis) Spectroscopy: Interpret chromophores, auxochromes, absorption maxima and solvent effects to analyze conjugated systems and transition metal complexes. - Infrared (IR): Identify functional groups by analyzing characteristic vibrational frequencies, fingerprint regions, dipole moment changes, and polarizability changes. - Atomic Spectroscopy: Differentiate between emission, absorption, and plasma-based (ICP) methods for trace elemental analysis.
21. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and biochemical analysis

- Homework that requires subjective explanations in causal ways

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	- Introduction to Electromagnetic Radiation (EMR)- Wave-particle duality, frequency, wavelength, and energy relations- Electromagnetic spectrum regions and associated transitions	Electromagnetic Radiation (EMR) Fundamentals	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	5	- Interaction of EMR with matter (absorption, emission, scattering)- Quantum transitions and energy level diagrams- Basic components of optical spectroscopy instruments	Fundamentals of Optical Spectroscopy & Instrumentation	=	=
3	5	- Principles of UV-Vis Spectroscopy and electronic transitions ($\pi \rightarrow \pi^*$, $n \rightarrow \pi^*$)- Chromophores, auxochromes, bathochromic and hypsochromic shifts- Beer-Lambert Law, absorptivity, and quantitative deviations	UV-Visible Spectroscopy: Principles & Laws	=	=
4	5	- Instrumentation for UV-Vis (sources, monochromators, detectors)- Single-beam vs. double-beam spectrophotometers- Solvent effects and sample handling in UV-Vis	UV-Vis Instrumentation & Practical Applications	=	=
5	5	- Application of Woodward-Fieser rules for conjugated dienes and polyenes- Quantitative determinations of single and multi-component mixtures- Photometric titrations	Qualitative & Quantitative UV-Vis Analysis	=	=
6	5	- Principles of Infrared (IR) Spectroscopy and molecular vibrations- Degrees of freedom stretching and bending modes- Hooke's Law and calculation of vibrational frequencies	Infrared Spectroscopy: Theoretical Principles	=	=
7	5	First exam of first course	First Exam	=	=
8		- Dispersive IR vs. Fourier Transform Infrared (FTIR) instrumentation- Sample	FTIR Instrumentation & Sampling Techniques		

		preparation techniques (KBr pellets, Nujol mulls, ATR)- Key components of FTIR spectrometers			
9	5	- Interpretation of IR spectra: Functional group region vs. Fingerprint region- Characteristic absorption bands for alkanes, alkenes, alkynes, and aromatics- Identification of carbonyl compounds, alcohols, amines, and carboxylic acids	IR Spectral Interpretation & Functional Groups	=	=
10	5	Principles of Atomic Spectroscopy vs. Molecular Spectroscopy- Energy levels in free atoms and atomic line spectra- Flame Atomic Absorption Spectroscopy (FAAS) principles and instrumentation	Introduction to Atomic Spectroscopy & FAAS	=	=
11	5	Atomization techniques (flame electrothermal/graphite furnace) Interferences in atomic absorption (spectral, chemical, ionization) and corrections- Quantitative methods (calibration curves, standard addition method)	Atomic Absorption Spectroscopy (AAS) & Interferences	=	=
12	5	- Principles of Atomic Emission Spectroscopy (AES)- Flame Photometry and Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES)- Instrumentation and plasma torch excitation mechanisms	Atomic Emission Spectroscopy & ICP-OES	=	=
13	5	- Applications of atomic spectroscopy in environmental, biological, and industrial samples- Comparison between AAS, AES, and ICP techniques regarding sensitivity and detection limits	Analytical Applications of Atomic Spectroscopy	=	=
14	5	- Multi-spectral problem solving integrating UV-Vis, IR, and Atomic Spectroscopy- Method validation parameters (LOD, LOQ, precision, accuracy) in spectroscopy- Comprehensive review of course content	Integrated Multi-Spectral Analysis & Review	=	=
15	5	Second exam of first course	Second Exam	=	=

23. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	1- Skoog, D. A., Holler, F. J., & Crouch, S. - .R. Principles of Instrumental Analysis. 2- Skoog, D. A., West, D. M., Holler, F. J., & Crouch, S. R. Fundamentals of Analytical .Chemistry. Cengage Learning 3. Harris, D. C., & Lucy, C. A. Quantitative .Chemical Analysis. W. H. Freeman 4. Christian, G. D., Dasgupta, P. K., & Schug, .K. A. Analytical Chemistry. Wiley
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

First course

Course Description Form

1. Course Name:	
Polymer Chemistry	
2. Course Code:	
Che-4742	
3. Semester / Year:	
Semester 1	
4. Description Preparation Date:	
10/ 9 / 2026	
5. Available Attendance Forms:	
Weekly / obligatory(mandatory)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Abdlwahhab Hameed Majeed Email: abdlwahhab@uodiyala.edu.iq Name: Omar Ghazi Hamoodi Email: omerkazi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives	• Understanding the chemistry of polymers and the basic principles of their formation and properties. • Studying the classification of polymers according to different criteria and principles. • Learning the rules of polymer nomenclature and the scientific methods used to name polymers. • Studying the factors affecting the properties and behavior of polymers. • Identifying the different types of polymers and studying the characteristics of each type. • Studying the main criteria and classifications of each type of polymer in precise scientific detail. • Identifying the most important polymers belonging to each classification and understanding their properties. • Studying the industrial uses and applications of polymers in various fields. • Linking theoretical knowledge with practical applications of polymers in daily life. • Understanding the role of polymers in meeting human daily needs, including: - Manufacturing clothes, fibers, and textiles. - Producing dyes and coloring materials.

	- Manufacturing adhesives and glues. - Producing tools and equipment used in the food industry. - Manufacturing various plastic products, tools, and equipment. - Using polymers in numerous industrial, engineering, medical, and other applications. • Recognizing the importance of polymers in industry and everyday life and their role in developing a wide range of products and materials required by humans.
9. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and biochemical analysis - Homework that requires subjective explanations in causal ways

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introducing the student to the chemistry of polymers and the degree of polymerization and how to calculate it	Polymer Chemistry	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	4	Introduce the student to the classification of polymers and know the types of each class	classification of polymers	=	=
3	4	Definition of the student naming polymers	nomenclature of polymers	=	=
4	4	Factors affecting polymers	Factors affecting polymers	=	=
5	4	Types of Molecular Weight of Polymers, Molecular Weight Diffusion Rate of Polymers	Molecular weight of polymers	=	=
6	4	The most important types of reactions leading to the formation of condensing polymers, controlling the molecular weight of condensing polymers	condensation polymerization	=	=
7	4	The most important types of reactions leading to the formation of condensing	Condensation polymers	=	=

		polymers, controlling the molecular weight of condensing polymers			
8		The most important types of condensing polymers: Polyesters, polyamides, polyurea, polyurethane, copolymers	Industrial condensing polymers		
9	4	The first month exam	is a theoretical exam in the previous article mentioned above	=	=
10	4	Ionic polymerization and its types, its importance, the difference between condensation and addition polymerization	addition polymerization	=	=
11	4	Types of addition polymerization, free radical polymerization, its mechanisms, initiators, the most important polymers that exhibit this type of polymerization	negative ionic addition polymerization	=	=
12	4	Ionic addition polymerization, types, anionic ionic addition polymerization, its initiations, polymerization mechanism, the most important polymers that exhibit this mechanism	Anionic addition polymerization	=	=
13	4	Cationic addition polymerization, its precursors, the polymerization mechanism, the most important polymers that exhibit this mechanism	Cationic addition polymerization	=	=
14	4	The most important factors affecting on the ionic addition polymerization, temperature, polarity of the solvent, type of monomer, nature of the polymeric chain, live polymerization	Ionic addition and coordination polymerization	=	=
15	4	Second exam of first course		=	=

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Polymer Chemistry (Koltzenburg, Sebastian, Maskos, Michael, Nuyken, Oskar)
Recommended books and references (scientific journals, reports...)	Introduction to Polymer Chemistry (Charles E. Carraher J.
Electronic References, Websites	https://www.goodreads.com/book/show/1355898.The_Chemist_And_Technology_Of_Petroleum https://www.kobo.com/gr/en/ebook/textbook-of-polymer-chemistry

First course

Course Description Form

1. Course Name:					
Quantum chemistry					
2. Course Code:					
Che-4741					
3. Semester / Year:					
Semester 1					
4. Description Preparation Date:					
10 September 2025					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90 hours / 6 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Zaid Hameed Mahmoud Email: zaidhamid@uodiyala.edu.iq					
8. Course Objectives					
Course Objectives			Introduce the students to quantum chemistry and its applications, as well as application of molecular spectra		
9. Teaching and Learning Strategies					
Strategy		Lecture method and using data show Explanation and clarification			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Theoretical introduction to quantum chemistry and		Data show and	Reports and

		introduction to mathematics		expansion	homework
2	3	Classical mechanics: Newton's laws		=	=
3	3	Harmonic oscillator in spherical coordinates		=	=
4	3	Wave-particle duality, dual nature of light, Heisenberg uncertainty		=	=
5	3	Black body radiation and photoelectric effect		=	=
6	3	Bohr-Rutherford theory		=	=
7	3	Spectral lines of atoms		=	=
8	3	First exam of first course		=	=
9	3	Schrödinger equation and wave function		=	=
10	3	Principles and postulates of Quantum mechanics		=	=
11	3	Applications of Schrödinger equation		=	=
12	3	Angular momentum and Hydrogen atom		=	=
13	3	Degeneration of energy states		=	=
14	3	Atomic structure and periodic law		=	=
15	3	Second exam of first course		=	=

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student, such as daily preparation, daily oral, monthly, or written exams, reports, etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	P.W.Atkins, Physical Chemistry, C.N.Banwell, Fundamental of Molecular Spectroscopy
Main references (sources)	Lecture notes of MIT
Recommended books and references (scientific journals, reports...)	Quantum Mechanics and Spectroscopy I and II by J. E. Parke
Electronic References, Websites	

First course

Course Description Form

13. Course Name:	
Organic diagnosis 1	
14. Course Code:	
Che-4740	
15. Semester / Year:	
Semester 1	
16. Description Preparation Date:	
1/ 9 / 2025	
17. Available Attendance Forms:	
Weekly / obligatory(mandatory)	
18. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours	
19. Course administrator's name (mention all, if more than one name)	
Name: Safaa Abdulhameed Dadwoosh Email: safaabdulhameed@uodiyala.edu.iq	
20. Course Objectives	
Course Objectives	To provide students with extensive information about the organic diagnostic chemistry of chemical compounds, identify the structural formula of each compound, and use spectroscopic methods such as nuclear magnetic resonance.
21. Teaching and Learning Strategies	
Strategy	- Lecture method and use of the interactive board - Explanation and clarification - Providing students with fundamentals and additional topics related to the outcomes of chemical thinking and analysis in everyday life - Forming discussion groups during lectures to discuss organic diagnostic chemistry topics that require thinking and analysis - Asking students thought-provoking questions during lectures, such as what, how, when, and why, for specific topics - Assigning homework that requires students to provide causal explanations in their own words -

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to organic diagnostics	Definition of organic diagnostic chemistry	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	4	Diagnostic introduction to regions of the electromagnetic spectrum	Microwave, radio, and infrared radiation	=	=
3	4	Sources of ultraviolet radiation	Sun and related stars	=	=
4	4	Introduction to the Beer–Lambert law	Comprehensive definition of the law	=	=
5	4	Definition of these transitions and bonds	Electronic transitions and bonds	=	=
6	4	Understanding the Woodward–Fieser rule	Comprehensive understanding of wavelength calculation	=	=
7	4	First monthly examination	Comprehensive questions covering all lectures explained	=	=
8		Introduction to factors affecting band position in the ultraviolet spectrum	Introduction to conjugation and steric hindrance		
9	4	Importance in calculating the wavelength of aromatic compounds	Understanding all examples	=	=
10	4	Effect of substituent groups and their vibrations	Comprehensive definition of electron-withdrawing and electron-donating groups	=	=
11	4	Infrared radiation and its diagnostic significance	Comprehensive information about infrared radiation	=	=
12	4	Types of molecular vibrations	Identification of stretching and bending	=	=
13	4	Factors affecting bond vibration	Bond flexibility – hybridization – resonance	=	=

14	4	Identification of absorption of functional groups: alkane – alkene – alkyne	Complete information about hydrocarbons	=	=
15	4	Second monthly examination	Comprehensive questions covering all lectures explained	=	=

23. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry / Morrison Organic Chemistry / Silverstein
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Organic Chemistry – Clayden
Electronic References, Websites	

First course

Course Description Form

25. Course Name:					
Hormones					
26. Course Code:					
Che-4743					
27. Semester / Year:					
Firs t semester/2026					
28. Description Preparation Date:					
19/09/2026					
29. Available Attendance Forms:					
Weekly/ mandatory					
30. Number of Credit Hours (Total) / Number of Units (Total)					
30 Hours / 2 units					
31. Course administrator's name (mention all, if more than one name)					
Name: Dr. Najwa Jameel Hameed Email: aganjwa9@gmail.com					
32. Course Objectives					
Course Objectives		- Giving to students condensed information about hormones.... - Hormones disorders and related medical conditions.... 			
33. Teaching and Learning Strategies					
Strategy	- Lectures using data show - Oral explanation - Illustration using white board and animated vedios				
34. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Learning about Hormones world	Hormones , hormones importance,	Data sheet white board	Quiz,reports, arguments
2	2	How hormones work	Hormones characteristics mechanisms of function	Data sheet white board	Quiz,reports, arguments
3	2	How hormones work molecular level	The Mechanisms of the first messenger	Data sheet white board	Quiz,reports, arguments
4	2	How hormones work molecular level	The Mechanisms of the second messenger	Data sheet white board	Quiz,reports, arguments
5	2	Hormones receptors	Hormones Receptors, Receptor regulation, Hormone regulation	Data sheet white board	Quiz,reports, arguments
6	2	Endocrine system	Endocrine system, endocrine glands	Data sheet white board	Quiz,reports, arguments
7	2	Endocrine system	Hypothalamus and anterior pituitary gland , stimuli hormonal secretion	Data sheet white board	Quiz,reports, arguments
8	2	Endocrine system	Hypothalamic and pituitary disorders	Data sheet white board	Quiz,reports, arguments
9	2	Endocrine system	HPT axis, stimulus, secretion	Data sheet white board	Quiz,reports, arguments

10	2	Endocrine system	HPT axis, stimulus, secretion	Data show, white board	Quiz, reports, arguments
11	2	Endocrine system	HPT disorder	Data show, white board	Quiz, reports, arguments
12	2	Endocrine system	HPA axis, stimulus, secretion	Data show, white board	Quiz, reports, arguments
13	2	Endocrine disease	HPA disorders and diseases	Data show, white board	Quiz, reports, arguments
14	2	Hormones as drugs	Hormones applications as drugs	Data show, white board	Quiz, reports, arguments
15	2	Examination	Examination		

35. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Hormonal signaling in biology and medicine by Gerald Litwack 2- Practical Clinical Biochemistry by H. Varley
Main references (sources)	Above mentioned

Recommended books and references (scientific journals, reports...)	1- Biochemical guide to hormones • David Aebischer, 2-Hormones and the Endocrine System • <u>Bernhard Kleine</u> , • <u>Winfried G. Rossmanith</u>
Electronic References, Websites	Elsevier , PubMed

First course

Course Description Form

1. Course Name: English language	
English language 4	
2. Course Code:	
Che-4744	
3. Semester / Year: first semester 2026	
fourth year	
4. Description Preparation Date:	
2026/09/19	
5. Available Attendance Forms:	
Mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Najwa J Hameed Email: aganajwa9@gmail.com	
8. Course Objectives	
Course Objectives	Teaching the students all the necessary information about the Inorganic chemistry subject which make them able to work in the field of Inorganic Chemistry Give idea about the periodic properties of the elements, study the molecular symmetry, study the standard electrode potential, study and classification of Acids and Bases, Explanation of Main elements in the periodic table from group 3 to 7. Study the basis of Solid State Chemistry including crystal system of Cube. Study the Magnetochemistry
9. Teaching and Learning Strategies	
Strategy	Explanation and clarification Lecture method and questioning method Model display method

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		If conditional types	Board and data sheet	Daily exams Homework Monthly exam
2	2		examples on if conditional		=
3	2		Exercises		=
4	2		Some chemical terms		=
5	2		definition of the chemical terms		=
6	2		writing an article		=
7	2		parts of a research		=
8	2		Types of researches		=
9	2		how to write summary		=
10	2		how to write an abstract		=
11	2		how to write an introduction		=
12	2		how to write a conclusion		=
13	2		How to write methods		=
14	2		How to write discussion		=
15	2		Exam		
11.					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			New Headway Beginner, by Liz and John Soars		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Oxford English grammar By Sedney Greenbaum		
Electronic References, Websites					

Fourth

2nd semester

Second course

Course Description Form

1. Course Name:	
Metabolic chemistry 2	
2. Course Code:	
Che-4846	
3. Semester / Year:	
Semester 2	
4. Description Preparation Date:	
10/ 9 / 2025	
5. Available Attendance Forms:	
Weekly / obligatory(mandatory)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
75 hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Khalid Shaalan Sahab Email: Khalidshalaan@yahoo.com	
8. Course Objectives	
Course Objectives	- Define the metabolism and its importance - Biosynthesis of molecules of cells - Catabolism of dietary molecules to liberate the energy - Define the fates of molecules (clinical importance) that produced from metabolism - Knowledge the chemistry of blood - Define the determination methods used to estimate the blood molecules and its applications - Teaching and learning the students any essential and necessary information related to biochemistry.
9. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and biochemical analysis - Homework that requires subjective explanations in causal ways

1	5	- Metabolism of nucleotides/ Digestion of dietary nucleic acids and absorption of its components	- Metabolism of nucleotides/ Digestion of dietary nucleic acids	=	=
2	5	Anabolism of purine nucleotides	Anabolism of purine nucleotides		
3	5	Anabolism of pyrimidine nucleotides Catabolism of nucleotides	Anabolism of pyrimidine nucleotides Catabolism of nucleotides	=	=
4	5	- Formation deoxyribo-nucleotides - Regulation of nucleotides formation	- Formation deoxyribo-nucleotides - Regulation of nucleotides formation	=	=
5	5	- Catabolism of nucleotides - Catabolism of purine nucleotides Catabolism of pyrimidine nucleotides	- Catabolism of nucleotides	=	=
6	5	Disorders related nucleotides metabolism	Disorders related nucleotides metabolism	=	=
7	5	Replication and transcription of DNA	Replication, transcription and	=	=
8	5	Translation of genetic information and biosynthesis of proteins Genetic mutations	Biosynthesis of proteins Genetic mutations	=	=
9	5	Fires exam of second course		=	=
10	5	Blood chemistry Constituents of blood/ Blood proteins and its biological role	Blood chemistry		
11	5	Red and white blood cells and its biological role	Blood chemistry	=	=
12	5	Platelet and blood clotting	Blood chemistry	=	=
13	5	Human nutrition	Human nutrition	=	=
14	5	Human nutrition	Human nutrition	=	=
15	5	Second exam of second course			

10. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
11. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	1- Harpers Illustrated Biochemistry, 2- Principle of Bio Chemistry, Smith & White 3- Biochemistry by Armstrong 4-Lehninger Principle of Bio Chemistry
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Second course

Course Description Form

12.	Course Name:	
		Electrolytic analysis
13.	Course Code:	
		Che-4845
14.	Semester / Year:	
		Semester 1
15.	Description Preparation Date:	
		1/ 2 / 2025
16.	Available Attendance Forms:	
		Weekly / obligatory(mandatory)
17.	Number of Credit Hours (Total) / Number of Units (Total)	
		75 hours
18.	Course administrator's name (mention all, if more than one name)	
		Name: Prof. Dr. Sahar Raihan Fadhel Email: saharraihan@uodiyala.edu.iq
19.	Course Objectives	
Course Objectives	- Understand Fundamental Electrochemical : the concepts of redox reactions, standard reduction potentials, cell potentials (E°), and the Nernst equation for equilibrium systems. - Potentiometry: Learn the design, operational principles, and analytical applications of indicator electrodes, reference electrodes (e.g., Ag/AgCl, SCE), and ion-selective electrodes (ISEs). - Voltammetry & Polarography: Interpret current-potential curves using techniques such as Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV), Differential Pulse Voltammetry (DPV), and Square Wave Voltammetry (SWV) to study redox mechanisms, diffusion coefficients, and reversible/irreversible reactions. - Coulometry & Electrogravimetry: Apply Faraday's laws of electrolysis to quantitative determination via controlled-potential and controlled-current bulk electrolysis. - Understand solute partitioning mechanisms between stationary and mobile phases, distribution constants , and retention factors. - Evaluate Chromatographic Efficiency: Apply the Van Deemter equation to optimize flow rate), minimize band broadening, and evaluate theoretical plate numbers and height equivalent to a theoretical plate (HETP). - Assess Resolution & Selectivity: Calculate and optimize resolution, selectivity , and capacity factor to achieve complete separation of complex mixtures.	

20. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and chemical analysis - Homework that requires subjective explanations in causal ways

21. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	- Introduction to Electrochemical Analysis- Fundamentals of redox reactions and electrochemical cells- Nernst equation and cell potential calculation	Fundamentals of Electrochemistry & Cell Thermodynamics	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	5	- Potentiometry principles- Reference electrodes (SCE, Ag/AgCl)- Indicator electrodes and Ion-Selective Electrodes (ISE)	Potentiometric Analysis & Ion-Selective Electrodes	=	=
3	5	- Voltammetry and Polarography fundamentals- Dropping Mercury Electrode (DME) and Ilkovic equation- Cyclic Voltammetry (CV) and reversible/irreversible systems	Voltammetric & Polarographic Techniques	=	=
4	5	- Coulometry principles: Faraday's laws of electrolysis- Controlled-potential vs. controlled-current coulometry- Amperometric titrations and applications	Coulometric & Amperometric Methods	=	=
5	5	- Conductometry fundamentals and conductivity cells.	Conductometric Analysis	=	=
6	5	- Applications of	Advanced	=	=

		electrochemical sensors and biosensors- Interference and calibration methods electrochemistry- Review of electrochemical methods	Electrochemical Applications & Sensors		
7	5	First exam of first course		=	=
8		- Introduction to Chromatography principles and classification- Plate theory and Rate theory (Van Deemter equation)- Column efficiency, resolution, and selectivity factor	Fundamentals of Separation Science Chromatographic Parameters		
9	5	Chromatography (TLC) and Paper Chromatography- Stationary and mobile phase selection-	Thin Layer & Paper Chromatography	=	=
10	5	- Gas Chromatography (GC) instrumentation and carrier gases- Stationary phases:	Gas Chromatography (GC) Principles & Instrumentation	=	=
11	5	- Detectors in Gas Chromatography (FID, TCD, ECD, MS)- Quantitative analysis methods (Internal and External standards)	GC Detectors & Quantitation Methods	=	=
12	5	- High-Performance Liquid Chromatography (HPLC) instrumentation- Isocratic vs. Gradient elution modes- Pumping systems, sample injection, and column technology	High-Performance Liquid Chromatography (HPLC) Basics	=	=
13	5	- Reversed-Phase (RP-HPLC) vs. Normal-Phase (NP-HPLC)- HPLC Detectors (UV/Vis, Fluorescence, Refractive Index, LC-MS)- Method optimization and mobile phase selection	HPLC Separation Modes & Detectors	=	=
14	5	- Ion-Exchange Chromatography (IEC)- Size Exclusion Chromatography	Special Chromatographic Techniques (Ion-Exchange & Size	=	=

		(SEC/GPC)- Affinity Chromatography principles and applications	Exclusion)		
15	5	Second exam of first course		=	=

22. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
23. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	1- Skoog, D. A., Holler, F. J., & Crouch, S. - .R. Principles of Instrumental Analysis. 2- Skoog, D. A., West, D. M., Holler, F. J., & Crouch, S. R. Fundamentals of Analytical .Chemistry. Cengage Learning 3. Harris, D. C., & Lucy, C. A. Quantitative .Chemical Analysis. W. H. Freeman 4. Christian, G. D., Dasgupta, P. K., & Schug, .K. A. Analytical Chemistry. Wiley
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Second course

Course Description Form

24.	Course Name:	Petroleum chemistry and petrochemicals		
25.	Course Code:	Che-4849		
26.	Semester / Year:	Semester 2		
27.	Description Preparation Date:	10/ 9 / 2026		
28.	Available Attendance Forms:	Weekly / obligatory(mandatory)		
29.	Number of Credit Hours (Total) / Number of Units (Total)	60 hours		
30.	Course administrator's name (mention all, if more than one name)	Name: Abdlwahhab Hameed Majeed Email: abdulwahhab@uodiyala.edu.iq Name: Omar Ghazi Hamoodi Email: omerkazi@uodiyala.edu.iq		
31.	Course Objectives	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center; vertical-align: top;">Course Objectives</td> <td> Introducing students to the basic principles of petroleum chemistry. Studying the chemical composition of crude oil and its main components. Understanding the origin and formation of crude oil. Studying the classification of crude oil according to its different characteristics and compositions. Identifying the most important general and specific properties of crude oil and its derivatives. Studying methods for purifying crude oil and petroleum derivatives from various pollutants and impurities. Understanding methods for reducing the concentration of pollutants in petroleum products to help minimize environmental pollution. Studying the processes of crude oil refining and the methods used to separate it into its basic fractions and derivatives. Identifying the main petroleum derivatives and their properties and applications. Understanding the importance of petroleum derivatives in daily life and their widespread use in various fields. Recognizing the role of petroleum and its derivatives in providing the energy required to meet human needs and facilitate various aspects of modern life. </td> </tr> </table>	Course Objectives	Introducing students to the basic principles of petroleum chemistry. Studying the chemical composition of crude oil and its main components. Understanding the origin and formation of crude oil. Studying the classification of crude oil according to its different characteristics and compositions. Identifying the most important general and specific properties of crude oil and its derivatives. Studying methods for purifying crude oil and petroleum derivatives from various pollutants and impurities. Understanding methods for reducing the concentration of pollutants in petroleum products to help minimize environmental pollution. Studying the processes of crude oil refining and the methods used to separate it into its basic fractions and derivatives. Identifying the main petroleum derivatives and their properties and applications. Understanding the importance of petroleum derivatives in daily life and their widespread use in various fields. Recognizing the role of petroleum and its derivatives in providing the energy required to meet human needs and facilitate various aspects of modern life.
Course Objectives	Introducing students to the basic principles of petroleum chemistry. Studying the chemical composition of crude oil and its main components. Understanding the origin and formation of crude oil. Studying the classification of crude oil according to its different characteristics and compositions. Identifying the most important general and specific properties of crude oil and its derivatives. Studying methods for purifying crude oil and petroleum derivatives from various pollutants and impurities. Understanding methods for reducing the concentration of pollutants in petroleum products to help minimize environmental pollution. Studying the processes of crude oil refining and the methods used to separate it into its basic fractions and derivatives. Identifying the main petroleum derivatives and their properties and applications. Understanding the importance of petroleum derivatives in daily life and their widespread use in various fields. Recognizing the role of petroleum and its derivatives in providing the energy required to meet human needs and facilitate various aspects of modern life.			

	• Developing students awareness of the environmental impacts of petroleum and the importance of adopting appropriate purification and refining methods to reduce pollution.
32. Teaching and Learning Strategies	
Strategy	- Lecture method and use of interactive whiteboard with explanation and clarification - Provide students with the basics and additional topics related to the outcomes of thinking and biochemical analysis - Homework that requires subjective explanations in causal ways

33. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Teaching the student the chemistry of oil, the beginning of the emergence of oil, the most important theories that explain the emergence of oil	Chemistry of petroleum	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	4	The most important hydrocarbon and non-hydrocarbon components and the percentage of their presence in crude oil	Chemical composition of crude oil	=	=
3	4	Classification of crude oil in relation to its basis, the most important general characteristics of crude oil	Crude oil basics	=	=
4	4	Characteristics of oil derivatives, their importance and the extent to which they are related to different oil products	Characteristics of petroleum products	=	=
5	4	Crude oil treatment and re-refining, separation of water and salts, separation of emulsions, separation of gases, physical processes: distillation and its types, extraction with solvents, absorption and stripping,	Crude oil processing and re-refining	=	=

		thermal diffusion,			
6	4	Chemical processes in oil refining, thermal cracking, thermal catalytic cracking, catalytic alkylation	Chemical processes in oil refining	=	=
7	4	Catalytic structural transformation processes and their types, catalytic isomerization processes, catalytic polymerization processes	Chemical processes in oil refining	=	=
8		The first month exam			
9	4	Treatment and purification processes, impurities to be removed, treatment with sulfuric acid, removal of mercaptans	Processing and purification	=	=
10	4	Treatment and purification processes, treatment with clay, treatment with molecular sieves, desalination, treatment with hydrogen gas and its types	Processing and purification	=	=
11	4	The most important oil derivatives (an overview), natural gas, its types, methods of separation and its importance, gasoline and its composition, natural gasoline, automotive gasoline and its importance, improving the quality of gasoline.	Petroleum products	=	=
12	4	Kerosene and its importance, lighting and heating kerosene, engine and aircraft kerosene, aircraft kerosene and its types, gas oil (diesel fuel), fuel oils, lubricating oils and their types, oil greases, their composition and importance	Petroleum products	=	=
13	4	Petroleum wax, petroleum asphalt, petroleum solvents or	Petroleum products	=	=

		naphtha			
14	4	Petrochemical products	Petrochemical products	=	=
15	4	The second month exam		=	=

34. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

35. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	The Chemistry and Technology of Petroleum (James G. Speight)
Recommended books and references (scientific journals, reports...)	Petroleum Chemistry (Mohamed Sikkander)
Electronic References, Websites	https://www.goodreads.com/book/show/1355898.The_Chemist_And_Technology_Of_Petroleum

Second course

Course Description Form

1. Course Name:					
Molecular spectra					
2. Course Code:					
Che-4848					
3. Semester / Year:					
Semester 2					
4. Description Preparation Date:					
1 October 2025					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
75 hours / 6 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Zaid Hameed Mahmoud Email: zaidhamid@uodiyala.edu.iq					
8. Course Objectives					
Course Objectives				Introduce the application of molecular spectra	
9. Teaching and Learning Strategies					
Strategy		Lecture method and using data show Explanation and clarification			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Molecular orbital theory		Data show and expansion	Reports and home work
2	2	Ground and excited states and molecular spectroscopy		=	=
3	2	Rotational spectra, moment of inertia, molecular		=	=

		classification			
4	2	Degree of freedom and types of vibrations		=	=
5	2	Rotational spectra, theory and applications		=	=
6	2	Type of electronic transition		=	=
7	2	First exam		=	=
8	2	Electronic absorption spectra		=	=
9	2	Fluorescence and Phosphorescence		=	=
10	2	Electronic spectra in polyaromatic molecules		=	=
11	2	Franck-Condon transition		=	=
12	2	Intensity distribution within the band		=	=
13	2	Vibrational structure of electronic bands in diatomic molecules		=	=
14	2	Theory of rotation and rotation-vibration spectra		=	=
15	2	Second exam		=	=

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student, such as daily preparation, daily oral, monthly, or written exams, reports, etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	P.W.Atkins, Physical Chemistry, C.N.Banwell, Fundamental of Molecular Spectroscopy
Main references (sources)	Lecture notes of MIT
Recommended books and references (scientific journals, reports...)	Quantum Mechanics and Spectroscopy I and II by J. E. Parke
Electronic References, Websites	

Second course

Course Description Form

36. Course Name:	
Organic diagnosis 2	
37. Course Code:	
Che-4847	
38. Semester / Year:	
Semester 2	
39. Description Preparation Date:	
1/ 9 / 2025	
40. Available Attendance Forms:	
Weekly / obligatory(mandatory)	
41. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours	
42. Course administrator's name (mention all, if more than one name)	
Name: Safaa Abdulhameed Dadwoosh Email: safaabdulhameed@uodiyala.edu.iq	
43. Course Objectives	
Course Objectives	To provide students with extensive information about the organic diagnostic chemistry of chemical compounds, identify the structural formula of each compound, and use spectroscopic methods such as nuclear magnetic resonance.
44. Teaching and Learning Strategies	
Strategy	- Lecture method and use of the interactive board - Explanation and clarification - Providing students with fundamentals and additional topics related to the outcomes of chemical thinking and analysis in everyday life - Forming discussion groups during lectures to discuss organic diagnostic chemistry topics that require thinking and analysis - Asking students thought-provoking questions during lectures, such as what, how, when, and why, for specific topics - Assigning homework that requires students to provide causal explanations in their own words -

45. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to organic diagnostics	Definition of organic diagnostic chemistry	Board and interactive whiteboard	- Daily exams - Homework - Monthly exams
2	4	Diagnostic introduction to regions of electromagnetic radiation in nuclear resonance	Proton and carbon spectra	=	=
3	4	Origin of the nuclear magnetic resonance phenomenon	Resonance phenomenon	=	=
4	4	Nuclear magnetic spin states	Comprehensive definition of the law: with or against the field	=	=
5	4	How to obtain a resonance spectrum	Resonance spectrometer	=	=
6	4	Identification of the components of a resonance spectrum	Comprehensive identification of the recorder, radiation source, transmitter, and frequency receiver	=	=
7	4	First monthly examination	Comprehensive questions covering all lectures explained	=	=
8		Introduction to factors affecting band position in the resonance spectrum	Introduction to chemical shift		
9	4	Importance in calculating the frequency of aromatic compounds	Understanding all examples	=	=
10	4	Effect of substituent groups and their frequency	Comprehensive definition of electron-withdrawing and electron-donating groups	=	=
11	4	The solvent used and its diagnostic significance	Comprehensive information about resonance and frequency	=	=

12	4	Introduction to types of molecular frequencies	Identification of energy levels	=	=
13	4	Factors affecting splitting types in carbon-13 nuclear magnetic resonance	Bond flexibility – hybridization – resonance	=	=
14	4	Identification of absorption of functional and split groups of aliphatic compounds	Complete information about hydrocarbons	=	=
15	4	Second monthly examination	Comprehensive questions covering all lectures explained	=	=

46. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

47. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry / Morrison Organic Chemistry / Silverstein
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Organic Chemistry – Clayden
Electronic References, Websites	

Second course

Course Description Form

1. Course Name:	
Clinical Chemistry	
2. Course Code:	
Che-4851	
3. Semester / Year:	
Second semester/2026	
4. Description Preparation Date:	
1/2/2026	
5. Available Attendance Forms:	
Weekly/ mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Wafaa Sh. Al-Zuhairi Email: wafaashamkhi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives	Giving to students condensed information about Clinical Biochemistry..... Clinical Biochemistry disorders and related medical conditions....
9. Teaching and Learning Strategies	
Strategy	- Lectures using data show - Oral explanation - Illustration using white board and animated vedios

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Introduction to Clinical Chemistry	Definition of clinical chemistry	Data show, white board	Quiz,reports, arguments
2	2	Diabetes and Its Types	Type 1 and Type 2 diabetes and their associated complications	Data show, white board	Quiz,reports, arguments
3	2	Lipids	Understanding lipids and related disorders	Data show, white board	Quiz,reports, arguments
4	2	Introduction to Vitamins	Comprehensive overview of vitamins	Data show, white board	Quiz,reports, arguments
5	2	Vitamins B3, B5, and B7	Definitions of vitamins and their associated disorders	Data show, white board	Quiz,reports, arguments
6	2	Vitamin D3	Comprehensive overview of Vitamin D3 and related disorders	Data show, white board	Quiz,reports, arguments
7	2	First Monthly Exam	Examination		comprehensive questions covering all the lectures that have been taught.
8	2	Introduction to Electrolytes	Comprehensive introduction to electrolytes	Data show, white board	Quiz,reports, arguments

9	2	Clinical Significance of Electrolyte Imbalances	Understanding disorders related to electrolyte imbalances	Data show, white board	Quiz,reports, arguments
10	2	Enzymes	Comprehensive overview of enzymes	Data show, white board	Quiz,reports, arguments
11	2	Isoenzymes and Their Diagnostic Utility	Comprehensive information on isoenzymes	Data show, white board	Quiz,reports, arguments
12	2	Liver Function	Liver disorders and the tests used to assess liver function	Data show, white board	Quiz,reports, arguments
13	2	Kidney Function	Kidney disorders and the tests used to assess kidney function	Data show, white board	Quiz,reports, arguments
14	2	Cancer	Comprehensive information on cancerous tumors	Data show, white board	Quiz,reports, arguments
15	2	Second Monthly Exam	Examination		Drafting comprehensive questions covering all the lectures that have been

					taught.
11.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
12.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			• Clinical and Metabolic Biochemistry / Martin Crook • Biochemistry / Dr. Sami Al-Muzaffar • Biochemistry / Satyanarayana		
Main references (sources)			Above mentioned		
Recommended books and references (scientific journals, reports...)			Above mentioned are enough		
Electronic References, Websites					