

**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

**University of Basrah -College of Education for Pure Sciences- Department of
Chemistry**

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: Basrah

Faculty/Institute: College of Education for Pure Sciences

Scientific Department: Department of Chemistry

Academic or Professional Program Name: Inorganic Chemistry

Final Certificate Name: Bachelor of Science in Chemistry

Academic System: Annual

Description Preparation Date: 5/10/2023

File Completion Date: 10/3/2024



Signature:

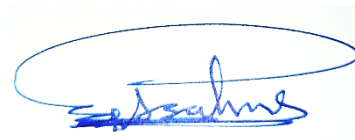
A handwritten signature in blue ink, appearing to be 'Mouayed Yousif Kadhum'.

Head of Department Name:

Prof.Dr. Mouayed Yousif Kadhum

Date: 2/10/2024

Signature:

A handwritten signature in blue ink, appearing to be 'Haider Qassem Fadhel'.

Scientific Associate Name:

Assis. Prof.Dr. Haider Qassem Fadhel

Date: 2/10/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department

Assis.Prof.Dr. Hayder Baqer Abdullah

Date: 2/10/2024

Signature:

A handwritten signature in blue ink, appearing to be 'Hayder Baqer Abdullah'.A handwritten signature in green ink, appearing to be 'Majid Mohammed Jasim'.

Approval of the Dean

Prof .Dr . Majid Mohammed Jasim

1. Program Vision

The College of Education for Pure Science always attempt to be one of the promising Higher Education institutions at the University of Basrah, in the field of future education and the scientific research through its scientific, research and administrative activity. Moreover, working on supplying useful route for the students and teachers to make them useful and inventive in the society in the field of chemistry science.

2. Program Mission

Work on manage and graduate the efficient students with highly management and scientific in chemistry, and develop the aptitude in the scientific research that bring benefit to the society and the country.

3. Program Objectives

- 1- Embodying the vision, mission and goals of the University of Basra, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
- 2- Preparing specialized students capable of serving the community and organizing for the preparation of future specializations.**

3- Spreading the culture of scientific and cultural diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.

4- The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and departments in different colleges to achieve best practices in the fields of education, learning, and scientific creativity.

5- Focusing on the educational and moral aspects of all college members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.

6- Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of science, laboratories and research achievements.

7- Focusing on the educational and moral aspect of the student and spreading the spirit of dedication, tolerance and commitment.

4. Program Accreditation
No

5. Other external influences
No

6. Program Structure				
Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	7	16	8.88	basic
College Requirements	9	36	20	basic
Department Requirements	23	128	71.11	basic + optional
Summer Training	No			
Other				

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

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First year	-	Inorganic Chemistry	2	0
First year	-	Analytical Chemistry	3	3
First year	-	Organic Chemistry	2	3
First year	-	Biology	1	2
First year	-	Mathematics	1	0
First year	-	Computer	0	2
First year	-	Developmental and Educational Psychology	2	0
First year	-	Foundations of Education	1	0
First year	-	Arabic Language	1	0
First year	-	English Language	1	0
First year	-	Human Rights and Democracy	1	0
First year	-	Chemical safety and Security	1	0
Second year	-	Inorganic Chemistry	2	3

Second year	-	Analytical Chemistry	2	3
Second year	-	Organic Chemistry	2	3
Second year	-	Physical Chemistry	3	3
Second year	-	Mathematics	1	0
Second year	-	Computer	0	2
Second year	-	Crimes of the Defunct Baath Party	1	0
Second year	-	Developmental Psychology	2	0
Second year	-	Administration and Secondary Supervision	2	0
Second year	-	English Language	1	0
Second year	-	Arabic Language	1	0
Third year	-	Inorganic Chemistry	2	3
Third year	-	Green Chemistry	2	0
Third year	-	Organic Chemistry	2	3
Third year	-	Physical Chemistry	2	3
Third year	-	Industrial Chemistry	2	0

Third year	-	Biochemistry	2	3
Third year	-	Scientific Research Methodology	2	0
Third year	-	Curricula and Methods of Teaching	2	0
Third year	-	Guidance and Psychological Health	2	0
Forth year	-	Instrumental Analysis Chemistry	3	3
Forth year	-	Biochemistry	2	0
Forth year	-	Industrial Chemistry	2	3
Forth year	-	Quantum Chemistry	2	0
Forth year	-	Organic and Spectroscopic Identification	2	3
Forth year	-	Measurement and Evaluation	2	0
Forth year	-	Practical Education and Observation	1	2
Forth year	-	Research Project	0	3
Forth year	-	Environmental Pollution	2	0

8. Expected learning outcomes of the program	
Knowledge	
A- Cognitive objectives	A1 -Preparing specialized scientific cadres with good efficiency in various journals of chemical sciences to contribute to achieving knowledge goals through environmental development and acquiring quality research and innovative skills A2 -Providing comprehensive knowledge requirements for students related to the field of chemistry ,which meets all the modern knowledge requirements that the student needs A3 -Enabling students to use scientific knowledge in the field of chemistry and other sciences in order to achieve cognitive communication between them in a way that serves the requirements of the times A4 -Enabling students to use the scientific knowledge they have received and apply it in

	practical fields within governmental and private educational institutions
Skills	
B- Skill objectives	B1 - Enabling students to conduct practical experiments in science laboratories, according to their specialization. B2 - Enabling students to acquire scientific skills in using various teaching methods in chemistry. B3 - Enabling students to gain practical experience by participating in interactive lectures. B4 - Enabling students to observe and apply experiments in middle and high schools.
Ethics	
C- Value objectives	C1- Enabling the student to use his/her skills and theoretical knowledge received in practical

	journals for employment in different departments C2- Enabling the student to develop his/her professional and academic personality C3- Enabling the student to use modern technical skills in various fields of documentation and communication C4- Enabling the student to develop and master the teaching profession using the basic concepts received in the teaching of chemistry and other sciences.
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9. Teaching and Learning Strategies	
1	-Explaining the scientific material using PowerPoint and the blackboard, and giving all the basic information that provides skill acquisition for the student

2 -Teaching students how to conduct scientific research by searching for library sources or from the Internet and determining what is scientifically useful for writing research.

3 -Enabling the student to link theoretical information with practical skills

4 -Providing field visits for students in specialized centers affiliated with different departments

10.Evaluation methods

1- Conducting oral exams for students

2-Conducting monthly exams for students

3- Conducting annual exams for students

4 -Adopting the method of discussion and dialog between students and their professors

5- Assigning students to prepare seminars on any research project

11.Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Chemistry	Inorganic Chemistry	-	-	3	-
Professor	Chemistry	Organic Chemistry	-	-	7	-
Professor	Chemistry	Analytical chemistry	-	-	3	-
Professor	Chemistry	Physical chemistry	-	-	4	-
Professor	Chemistry	Biochemistry	-	-	2	-
Professor	Chemistry	Industrial chemistry	-	-	3	-
Assistant Professor	Chemistry	Inorganic chemistry	-	-	3	-
Assistant Professor	Chemistry	Organic chemistry	-	-	2	-
Assistant Professor	Chemistry	Analytical chemistry	-	-	2	-
Assistant Professor	Chemistry	Physical chemistry	-	-	1	-
Assistant Professor	Chemistry	Biochemistry	-	-	0	-

Assistant Professor	Chemistry	Industrial chemistry	-	-	2	-
lecturer	Chemistry	Inorganic chemistry	-	-	1	-
lecturer	Chemistry	Organic chemistry	-	-	3	-
lecturer	Chemistry	Analytical chemistry	-	-	3	-
lecturer	Chemistry	Biochemistry	-	-	1	-
Assistant lecturer	Chemistry	Inorganic chemistry	-	-	1	-
Assistant lecturer	Chemistry	Physical chemistry	-	-	2	-
Assistant lecturer	Chemistry	Industrial chemistry	-	-	1	-
Assistant lecturer	Arabic language	Arabic language	-	-	1	-
lecturer	Chemistry	Physical chemistry	-	-	-	1 Ministerial contract
lecturer	Chemistry	Biochemistry	-	-	-	1 Ministerial contract
Assistant lecturer	Chemistry	Organic chemistry	-	-	-	1 Ministerial contract

Assistant lecturer	Chemistry	Analytical chemistry	-	-	-	2 Ministerial contract
Assistant lecturer	Chemistry	Physical chemistry	-	-	-	2 Ministerial contract
Assistant lecturer	Chemistry	Biochemistry	-	-	-	2 Ministerial contract
Assistant lecturer	Pedagogical guidance	Pedagogical guidance	-	-	-	1 Ministerial contract
lecturer	Pedagogical guidance	Pedagogical guidance	-	-	-	2
Assistant lecturer	Pedagogical guidance	Pedagogical guidance	-	-	-	2
Assistant lecturer	Arabic language	Arabic language	-	-	-	1

Professional Development

Mentoring new faculty members

1- Developing curricula by adding modern topics that keep pace with the development in chemistry

2 -Participation of teachers in seminars, courses and scientific conferences

3- Clarifying the quality requirements, course description, and job performance evaluation method

Professional development of faculty members

1 -Utilizing modern scientific sources

2 -Using fast communication networks to transfer information, such as the Internet

3 -Acquiring modern scientific experiences and skills in modern technical journals

4- Scientific field visits to modern laboratories

12.Acceptance Criterion

First, the conditions for admission to the college:

1 -Admission of students according to the centralized admission of the Ministry of Higher Education and Scientific Research

2 -The student must pass the personal interview tests approved by the College and University Council

3 -The student must fulfill the medical condition according to a special form.

Second, the conditions of admission to the scientific department:

1 -Choosing the student's desire according to the differentiation form

2 -The rate accepted in the college

3 -The prescribed rate followed by the department in which the student wishes to study

4- The capacity of the scientific department

13.The most important sources of information about the program

1 -Textbooks approved by the feudal committee for educational colleges

2 -Auxiliary books available in the college library

3 -Books and enrichment resources from the Internet

4- E-learning platforms

14.Program Development Plan

1 -Participation of the teaching staff in conferences and developmental courses related to teaching methods and scientific research

2- Developing scientific laboratories in the department and providing them with the latest scientific equipment and safety and security means compound

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 stage		Inorganic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Analytical chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Organic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Biology	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Mathematics	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Computer	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Developmental and Educational	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Foundations of education	Basic	•		•	•	•	•	•	•	•	•	•	•
		Arabic language	Basic	•		•	•		•	•	•	•	•	•	•
		English language	Basic	•	•	•	•	•	•	•	•	•	•	•	•

Second stage		Human Rights and Democracy	Basic	•	•	•	•		•	•	•	•	•	•	•
		Chemical safety and Security	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Inorganic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Analytical chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Organic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Physical chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Mathematics	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Computer	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Crimes of the Defunct Baath Party	Basic	•		•	•	•	•	•		•	•	•	•
		Developmental Psychology	Basic	•	•	•	•		•	•	•	•	•	•	•
		Administration and Secondary Supervision	Basic	•	•	•	•	•	•	•	•	•	•	•	•

Third stage		English language	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Arabic language	Basic	•		•	•		•	•	•	•	•	•	•
		Inorganic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Green chemistry	Optional	•	•	•	•	•	•	•	•	•	•	•	•
		Organic chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Physical chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Industrial chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Biochemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Scientific Research Methodology	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Curricula and Methods of Teaching	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Guidance and Psychological Health	Basic	•	•	•	•		•	•	•	•	•	•	•

Fourth stage		Instrumental Chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Biochemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Industrial chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Quantum chemistry	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Organic and Spectroscopic identification	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Measurement and evaluation	Basic	•	•	•	•		•	•	•	•	•	•	•
		Practical Education and Observation	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Research project	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Environmental pollution	Optional	•	•	•	•	•	•	•	•	•	•	•	•

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Academic Program Description

First Stage

Course Description Form

1. Course Name:				
Inorganic Chemistry				
2. Course Code:				
3. Semester / Year:				
Year				
4. Description Preparation Date:				
22/2/2024				
5. Available Attendance Forms:				
Available				
6. Number of Credit Hours (Total) / Number of Units (Total)				
90/4				
7. Course administrator's name (mention all, if more than one name)				
Name : Prof .Dr. Mouayed Yousif Kadhum				
8. Course Objectives				
Learn about the electronic structure of		•		
9. Teaching and Learning Strategies				
Strategy				
10.Course Structure				
week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method

1	Electronic construction of atoms		Lecture	Weakly and monthly exam
2	Types of radiation		Lecture	Weakly and monthly exam
3	Energy levels		Lecture	Weakly and monthly exam
4	Terms symbols		Lecture	Weakly and monthly exam
5	Electron shielding		Lecture	Weakly and monthly exam
6	Ionization energy , electron affinity		Lecture	Weakly and monthly exam
7	Ionic bond		Lecture	Weakly and monthly exam
8	Crystal latics energy		Lecture	Weakly and monthly exam
9	Construction of crystal latice		Lecture	Weakly and monthly exam
10	Covalent molecules construction		Lecture	Weakly and monthly exam
11	Polyatoms molecules		Lecture	Weakly and monthly exam
12	VSEPR method		Lecture	Weakly and monthly exam
13	Resonance		Lecture	Weakly and monthly exam
14	Molecular symmetry		Lecture	Weakly and monthly exam
15			Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Molecular orbital formation		Lecture	Weakly and monthly exam
18	Energy levels of molecular orbital		Lecture	Weakly and monthly exam
19	Hybridization		Lecture	Weakly and monthly exam
20	Magnetic properties of compounds		Lecture	Weakly and monthly exam
21	Bonding in simple molecules		Lecture	Weakly and monthly exam
22	Bonding in organic molecules		Lecture	Weakly and monthly exam
23	Valence bond theory		Lecture	Weakly and monthly exam
24	Molecular orbital theory		Lecture	Weakly and monthly exam
25	Coordination numbers		Lecture	Weakly and monthly exam
26	Periodic table		Lecture	Weakly and monthly exam

27	Hydrogen bond		Lecture	Weakly and monthly exam
28	Coordination bond		Lecture	Weakly and monthly exam
29	Metallic bond		Lecture	Weakly and monthly exam
30	Vander Val's forces		Lecture	Weakly and monthly exam
31	Radiation activity		Lecture	Weakly and monthly exam
32	Measurement of radiation activity		Lecture	Weakly and monthly exam

11.Course Evaluation

First Semester 25 Degree (Exam to the tasks assigned to the student such as daily preparation, daily oral, monthly), Semester 25 Degree. Final Exam 50 Degree.

12.Learning and Teaching Resources

Armstrong, Isobel. Victorian Poetry: Poetry, poetics and politics. Routledge, 2019	
- Basic Inorganic Chemistry, F.A.Cotton, G.Wilkinson and P.L.Gaus, 3rd edition, John Wiley and Sons, Inc. New York, 1995.	

Course Description of Analytical Chemistry					
First stage					
Course Instructor	Prof. Dr. Zainab Taha Husain				
Course Objective	Give information to the students about the fundamental of Analytical Chemistry.				
Course Description					
Textbook	An introduction of Analytical Chemistry, Flaska				
References	Fundamental of Analytical Chemistry, Dr. Karrem Al-Shallal				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	35%	15%	-	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Safety and hazard compounds	Qualitative Analysis	Lecture	Weakly and monthly exam
2	The scope of analytical chemistry	Analysis of cations group one	Lecture	Weakly and monthly exam
3	Qualitative analysis	Table of separation group one	Lecture	Weakly and monthly exam
4	Qualitative analysis	Analysis of cations group two	Lecture	Weakly and monthly exam
5	Methods of analytical chemistry	Table of separation group two	Lecture	Weakly and monthly exam
6	Concentrations	Analysis of cations group three	Lecture	Weakly and monthly exam
7	Definition of acid , base	Table of separation group three	Lecture	Weakly and monthly exam

8	Strong and weak electrolytes solution	Analysis of cations group four	Lecture	Weakly and monthly exam
9	Dissociation of water	Table of separation group four	Lecture	Weakly and monthly exam
10	Expression of concentration	Analysis of cations group five	Lecture	Weakly and monthly exam
11	Chemical equilibrium	Table of separation group five	Lecture	Weakly and monthly exam
12	Solubility	Analysis of anions group one	Lecture	Weakly and monthly exam
13	Application of solubility	Analysis of anions group two	Lecture	Weakly and monthly exam
14	Stoichiometric relationship	Analysis of anions group three	Lecture	Weakly and monthly exam
15	Solubility product	Analysis of anions group four & five	Lecture	Weakly and monthly exam
16				
17	Ion equilibrium	Volumetric analysis	Lecture	Weakly and monthly exam
18	Common ion effect	Acid-base titration	Lecture	Weakly and monthly exam
19	Effect of pH on solubility	Titration of HCl with NaCO_3	Lecture	Weakly and monthly exam
20	Acid-base equilibrium	Titration of NaOH with HCl	Lecture	Weakly and monthly exam
21	pH-calculation	Determination of acetic acid percent	Lecture	Weakly and monthly exam
22	Solution of strong acid	Determination of Na_2CO_3 & NaHCO_3 in mixture	Lecture	Weakly and monthly exam
23	Solution of strong base	Determination of hardness in water	Lecture	Weakly and monthly exam
24	Solution of salts	Precipitation titration	Lecture	Weakly and monthly exam
25	Buffer solution	Determination of Cl^- in water	Lecture	Weakly and monthly exam
26	Calculation of pH buffer solution	Oxidation-reduction titration	Lecture	Weakly and monthly exam
27	Volumetric analysis	Titration of permanganate with oxalate	Lecture	Weakly and monthly exam

28	Acid-base titration	Iodometric titration	Lecture	Weakly and monthly exam
29	Precipitation titration	Titration of thiosulfate with iodate	Lecture	Weakly and monthly exam
30	Redox titration	Titration of thiosulfate with dichromate	Lecture	Weakly and monthly exam
31	Compleximetric titration	Compleximetric titration	Lecture	Weakly and monthly exam

Course Description of Organic Chemistry					
First stage					
Course Instructor	Prof. Dr. Kaokab Ali Husain Assis.Prof.Dr. Huda Salih Abood				
E_mail					
Title	Organic Chemistry				
Course Coordinator	Type here the name of course coordinator				
Course Objective	Type here course objectives				
Course Description	Type here course description				
Textbook	Organic Chemistry				
References	Organic Chemistry(Herbert Meislich, Howard Nehamkin)				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	(35%)	(15%)		----	(50%)
General Notes	Type here general notes regarding the course				

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
------	----------------	-----------------------------	-----------------	-------------------

1				
2				
3				
4				
5	Structure and properties	Handling of common laboratory	Lecture	Weakly and monthly exam
6	Chemical bond polarity ,Acids& bases	Crystallisation	Lecture	Weakly and monthly exam
7	Intermolecular forces &hydrogen bond	Melting point	Lecture	Weakly and monthly exam
8	Alkanes	Boiling point	Lecture	Weakly and monthly exam
9	preparation of Alkanes	Simple Distillation	Lecture	Weakly and monthly exam
10	Reaction of Alkanes	Distillation	Lecture	Weakly and monthly exam
11	Chain reaction	Separation acid-base	Lecture	Weakly and monthly exam
12	Cycloalkanes	Separation acid- base	Lecture	Weakly and monthly exam
13	Reaction of Cycloalkanes	Preparation of methane	Lecture	Weakly and monthly exam
14	Preparation of Cycloalkanes		Lecture	Weakly and monthly exam
15	Exam 1		Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Alkenes	Preparation of ethylene	Lecture	Weakly and monthly exam
18	Preparation of alkenes	Preparation of acetylene	Lecture	Weakly and monthly exam
19	Alkenes reactions	Preparation of aspirin	Lecture	Weakly and monthly exam
20	Dienes	Sodium Test	Lecture	Weakly and monthly exam
21	Dienes reactions	Sodium Test	Lecture	Weakly and monthly exam
22	Alkynes	Sodium Test	Lecture	Weakly and monthly exam
23	preparation of alkynes	Fractional Distillation	Lecture	Weakly and monthly exam
24	Aromatic hydrocarbons	Fractional Distillation	Lecture	Weakly and monthly exam
25	reaction of Benzene	Steam Distillation	Lecture	Weakly and monthly exam
26	Mechanism of Electrophilic substitution	Steam Distillation	Lecture	Weakly and monthly exam
27	Arenes	Purification of kerosene	Lecture	Weakly and monthly exam

28	Exam2		Lecture	Weakly and monthly exam
29	Alkyl halide	Purification of kerosene	Lecture	Weakly and monthly exam
30	Alkyl halide reaction		Lecture	Weakly and monthly exam
31	Final Exam			

Course Description of Computer

First stage

Course Instructor	Yaser Nasir Hasen				
E-mail					
Title	Computer				
Course Coordinator	Concept of computer & application				
Course Objective	Concept of computer & application of computer science				
Course Description	Giving an idea about computers and their applications in our lives and all sciences				
Textbook	Computer				
References	Principles of Computers Computers and networks				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	35%	15%	-	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Introduction		Lecture	Weakly and monthly exam
2	History of computer		Lecture	Weakly and monthly exam
3	Processing units		Lecture	Weakly and monthly exam
4	Kin of memory		Lecture	Weakly and monthly exam

5	Input/output		Lecture	Weakly and monthly exam
6	Computer software		Lecture	Weakly and monthly exam
7	Numeric system		Lecture	Weakly and monthly exam
8	Transfer		Lecture	Weakly and monthly exam
9	Transfer		Lecture	Weakly and monthly exam
10	Examples		Lecture	Weakly and monthly exam
11	Algorithm		Lecture	Weakly and monthly exam
12	Examples		Lecture	Weakly and monthly exam
13	Application		Lecture	Weakly and monthly exam
14	Flow chart		Lecture	Weakly and monthly exam
15	Type of flow chart		Lecture	Weakly and monthly exam
16	examples		Lecture	Weakly and monthly exam
17	Windows		Lecture	Weakly and monthly exam
18	Contents		Lecture	Weakly and monthly exam
19	Opening of program		Lecture	Weakly and monthly exam
20	Major system		Lecture	Weakly and monthly exam
21	Parts of windows		Lecture	Weakly and monthly exam
22	M-word elements		Lecture	Weakly and monthly exam
23	Text		Lecture	Weakly and monthly exam
24	Documents		Lecture	Weakly and monthly exam
25	Move		Lecture	Weakly and monthly exam
26	Font		Lecture	Weakly and monthly exam
27	Print		Lecture	Weakly and monthly exam
28	Starting excel		Lecture	Weakly and monthly exam
29	Work sheet		Lecture	Weakly and monthly exam
30	Basic concept		Lecture	Weakly and monthly exam
31	Tables		Lecture	Weakly and monthly exam
32	Internet explorer		Lecture	Weakly and monthly exam

Course Instructor	Assis. Prof. Dr. Zainab Hamza				
E-mail					
Title	Common freedom and human rights				
Course Coordinator	Common freedom and human rights				
Course Objective	Teaching the students, the freedom, democracy and human rights.				
Course Description	Introduction and classification of freedom, comparison between freedom and responsibility, human rights knowledge and human rights universal statement.				
Textbook					
References					
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	50%	-	-	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Section methods		Lecture	Weakly and monthly exam
2	freedom Introduction		Lecture	Weakly and monthly exam
3	freedom's classification		Lecture	Weakly and monthly exam
4	Obstruction that prevent opinion freedom		Lecture	Weakly and monthly exam
5	Islamic theory and opinion freedom		Lecture	Weakly and monthly exam
6	Freedom and responsibility		Lecture	Weakly and monthly exam
7	democracy concept		Lecture	Weakly and monthly exam

8	Democracy types		Lecture	Weakly and monthly exam
9	Direct and indirect democracy		Lecture	Weakly and monthly exam
10	administrative corruption		Lecture	Weakly and monthly exam
11	financial corruption		Lecture	Weakly and monthly exam
12	Corruption types		Lecture	Weakly and monthly exam
13	administrative Corruption aspect		Lecture	Weakly and monthly exam
14	financial corruption aspect		Lecture	Weakly and monthly exam
15	Corruption control authority		Lecture	Weakly and monthly exam
16	Corruption control steps		Lecture	Weakly and monthly exam
17	human rights growth		Lecture	Weakly and monthly exam
18	human rights in ancient ages		Lecture	Weakly and monthly exam
19	human rights and Romanic philosophy		Lecture	Weakly and monthly exam
20	human rights and Arabic ancient mind		Lecture	Weakly and monthly exam
21	human rights and Islamic civilization		Lecture	Weakly and monthly exam
22	human rights essence		Lecture	Weakly and monthly exam
23	human rights inclusiveness		Lecture	Weakly and monthly exam
24	Humanity esteem		Lecture	Weakly and monthly exam
25	Human responsibility		Lecture	Weakly and monthly exam
26	human rights characteristic		Lecture	Weakly and monthly exam
27	human rights universal statement		Lecture	Weakly and monthly exam
28	Judicial and legality rights		Lecture	Weakly and monthly exam
29	Association, movement and life rights		Lecture	Weakly and monthly exam
30	Diplomatic and mental rights		Lecture	Weakly and monthly exam
31	Sociability and exclusivity rights		Lecture	Weakly and monthly exam
32	Cultural and educational rights		Lecture	Weakly and monthly exam

Academic Program Description

Second Stage

Course Description Form

1. Course Name:					
Inorganic Chemistry					
2. Course Code:					
3. Semester / Year:					
Year					
4. Description Preparation Date:					
22/2/2023					
5. Available Attendance Forms:					
Available					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90/5					
7. Course administrator's name (mention all, if more than one name)					
Name:			Email:		
Jassim Mohammad Saleh			jasim.salih@uobasrah.edu.iq		
Hayder Baqer Abdullah			hayder.baqer@uobasrah.edu.iq		
8. Course Objectives					
Learn about the periodic table, methods for preparing elements, and studying their properties and isotopes.			• • •		
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretica + 3 practical	Periodic table	The periodic table and its general properties.	Lecture and Lab.	Weekly and monthly exams, and laboratory reports
2	2 theoretica + 3 practical	Periodic table	Atoms distribution in periodic table		

3		The Hydrogen	Introduction, preparation, isotopes		
4		Hydrogen bonds	Hydrogen bond, Types, isotopes.		
5		Hybridization	Hybridization		
6		Exam.	Monthly Exam.		
7		Group I	Elements, nature availability		
8		Group I	Preparations and reactions		
9		Group II	Group II Elements, availability and properties		
10		Group II	Preparation and reactions		
11		Group III	Group III Elements, reactions and preparations		
12		Exam.	Monthly Exam.		
13		Group III	Boron Chemistry		
14		Group III	Aluminum Chemistry		
15		Group IV	Elements, Carbon chemistry		
16		Group IV	Silicon Chemistry		
17		Half year Exam.			
18		Half year vacation			
19		Group V	Elements, Nitrogen		
20		Group V	Phosphorous Chemistry		
21		Exam.	Monthly Exam.		
22		Group VI	Elements, nature availability		
23		Group VI	Oxygen Chemistry		
24		Group VI	Sulphur Chemistry		
25		Group VI	Other Elements		
26		Group VII	Elements, nature availability		

27		Group VII	Preparation and Reactions		
28		Final Exam			
11. Course Evaluation					
First Semester 25 Degree(Exam to the tasks assigned to the student such as daily preparation, daily oral, monthly), Semester 25 Degree. Final Exam 50 Degree.					
12. Learning and Teaching Resources					
Armstrong, Isobel. Victorian Poetry: Poet					
poetics and politics. Routledge, 2019					
- Basic Inorganic Chemistry, F.A.Cotton,					
G.Wilkinson and P.L.Gaus, 3rd edition,					
John Wiley and Sons, Inc. New York,					
1995.					

Course Description Form

1. Course Name:					
organic Chemistry					
2. Course Code:					
3. Semester / Year:					
Year					
4. Description Preparation Date:					
22/2/2023					
5. Available Attendance Forms:					
Available					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90/5					
7. Course administrator's name (mention all, if more than one name)					
Name:			Email:		
Nezar Latif			nezar.latif@uobasrah.edu.iq		
Rehab Gani Abood			rhab.gani@uobasrah.edu.iq		
8. Course Objectives					
Learn about the periodic table, methods for preparing elements, and studying their properties and isotopes.				• • •	
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical + 3 practical	Physical properties	Alkyl halides	Lecture and Lab.	Weekly and monthly exams, and laboratory reports
2	2 theoretical + 3 practical	Ways to name it			
3	2 theoretical + 3 practical	Methods of preparation			
4	2 theoretical + 3 practical	Their interactions			

5	2 theoretical	Physical properties	Alcohols		
6	+ 3 practical	Ways to name it			
7	2 theoretical	Methods of preparation			
8	+ 3 practical	it			
	2 theoretical	Their interactions			
	+ 3 practical				
9	2 theoretical	Physical properties	Phenols		
10	+ 3 practical	Ways to name it			
11	2 theoretical	Methods of preparation			
12	+ 3 practical	it			
	2 theoretical	Their interactions			
	+ 3 practical				
13	2 theoretical	General formula and	Aldehydes and ketones		
14	+ 3 practical	composition			
15	2 theoretical	Their interactions			
16	+ 3 practical	Nucleophilic addition			
	2 theoretical	to the carbonyl group			
	+ 3 practical	Condensation			
	2 theoretical	reactions			
	+ 3 practical	diagnosis of carbonyl			
		compounds			
17	2 theoretical	General formula and	Ethers and epoxides		
18	+ 3 practical	composition			
	2 theoretical	Its preparation and			
	+ 3 practical	reactions			
19	2 theoretical	General formula and	Carboxylic acids		
20	+ 3 practical	composition			
21	2 theoretical	Their interactions			
	+ 3 practical	Methods of preparation			
	2 theoretical	it			
	+ 3 practical	General formula and			
22	2 theoretical	physical properties	Derivatives of carboxylic acids		
23	+ 3 practical	Its preparation and			
	2 theoretical	reactions			
	+ 3 practical				
24	2 theoretical	General formula and	Amines		
25	+ 3 practical	physical properties			
26	2 theoretical	Methods of preparation			
	+ 3 practical	it			
	2 theoretical	Their interactions			
	+ 3 practical				
27	2 theoretical	General formula and	Organosulfur compounds		
	+ 3 practical	physical properties			

28	2 theoretical + 3 practical	Preparation methods and interactions			
29	2 theoretical + 3 practical	General formula and physical properties	Phosphorus compounds		
30	2 theoretical + 3 practical	Preparation methods and interactions			

11. Course Evaluation

First Semester 25 Degree (Exam to the tasks assigned to the student such as daily preparation, daily oral, monthly), Semester 25 Degree. Final Exam 50 Degree.

12. Learning and Teaching Resources

Armstrong, Isobel. Victorian Poetry: Poetics and politics.

- Basic Inorganic Chemistry, F.A. Cotton, G. Wilkinson and P.L. Gaus, 3rd edition, John Wiley and Sons, Inc. New York,

Course Description Form

1. Course Name:
Physical Chemistry
2. Course Code:
3. Semester / Year:
Year
4. Description Preparation Date:
7/3/2024
5. Available Attendance Forms:
Available
6. Number of Credit Hours (Total) / Number of Units (Total)
90/9
7. Course administrator's name (mention all, if more than one name)
Name: Uhood AL-Hamadani Email: uhood.obead@uobasrah.edu.iq Name: Sadiq Mohamad Hasan Ismael Email: sadiq.ismael@uobasrah.edu.iq

8. Course Objectives

- 1- Illustrate to the student the importance thermodynamics in our daily lives.
- 2- The student acquires experience in dealing with laws, charts and equations.

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-
-

9. Teaching and Learning Strategies

Strategy

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3 theoretical	Physical units and thermodynamic properties	Introduction	Lecture	Weekly and monthly exams, and laboratory reports
2		Alternating impacts of volum, pressure, and heat	Gases laws		
3		Alternating impacts of volum, pressure, and heat	Gases laws		

4		The properties of real and perfect gases	Types of gases		
5		Deviation from ideal behaviour	kinetic theory of gases		
6		Van der waals equation	Van der waals equation		
7		Types of systems and processes			
8		Types of work and energy			
9		Functions state			
10		The First Law of Thermodynamics			
11		Heat capacity			
12		Heat capacity			
13		Joule's experiment			
14		Adiabatic Processes			

15		Thermochemistry	Enthalpies for Different Types of Reactions		
16		Hess's law			
17		Second law of thermodynamics			
18		Relationship between entropy and heat capacity			
19		Carnot cycle			
20		Carnot cycle efficiency			
21		Third law of thermodynamics			
22		Free energy			
23		Dependence of Gibbs Energy on Temperature and Pressure			
24		Chemical equilibrium			
25		Le Chatelier's principle			

26		Van 't Hoff equation			
11.Course Evaluation					
First Semester 25 Degree (Exam to the tasks assigned to the student such as daily preparation, daily oral, monthly), Semester 25 Degree. Final Exam 50 Degree.					
12.Learning and Teaching Resources					
1- Physical Chemistry, Ninth Edition Peter Atkins and Julio de Paula					
2- CHEMICAL PRINCIPLES Atkins, Jones and Laverman's					

Academic Program Description

Third Stage

Course Description Form

1. Course Name:					
Organic Chemistry					
2. Course Code:					
3. Semester / Year:					
Year					
4. Description Preparation Date:					
24/2/2023					
5. Available Attendance Forms:					
Available					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90/5					
7. Course administrator's name (mention all, if more than one name)					
Name:			Email:		
Dawood Salem Abid			dawood.abid @uobasrah.edu.iq		
Dakhal Zaqr					
Ahmed Abdalhade Majed			cduppg.ahmed.majed @uobasrah.edu.		
8. Course Objectives					
Identify stereochemistry, acids, bases, intermedia and reaction mechanisms			• • •		
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical + 3 practical	Stereochemistry	Stereochemistry isomers Fisher Neumann form	Lecture and L	Weekly and monthly exams, and laboratory reports
2	2 theoretical + 3 practical	Stereochemistry	(stereochemistry)		

3		Stereochemistry	circulation Acids		
4		Acids	factors affecting acidity		
5		Base	increase Rules and		
6		Exam.	factors affecting the		
7		Intermediates	increase of basicity		
8		Carbonium ion	Monthly exam		
9		Carbonium ion	Knowledge of the		
10		Carbanion Ion	intermediates of organic		
11		Carbanion Ion	chemistry Knowledge of		
12		Exam.	the carbonium ion, the		
13		Mechanism Reaction	influencing factors		
14		Mechanism Reaction	the names of reactions		
15		SN2	and migration on the		
16		SN1	carbon atom Knowing		
17		Half year Exam.	the negative carbanion		
18		Half year vacation	ion, the influencing		
19		Elimination reaction	factors, the names of		
20		E1	reactions		
21		E2	migration on the carbon		
22		Exam.	atom and oxygen		
23		E1CB	Knowledge of		
24		Heterocyclic	the mechanism of		
25		Compounds	reaction and alkyl		
26		Heterocyclic	halides,		
		Compounds	the nature of the product		
			formation and the		
			influencing factors Mid-		
			year		
			exam Half		
			Vacation Year		
			Knowledge of reaction		
			mechanics Necophilic		
			compensation for alkyl		
			halides and the nature of		
			product formation		
			Introduction to deletion		
			reactions,		
			factors affecting them		
			and the products formed		
			Knowledge of		
			the intermediates and		
			products of reaction		
			mechanisms		
			Ellipsis and influencing		
			factors Monthly exam		
			Knowledge of the		
			intermediates and		

27		Heterocyclic Compounds	products of reaction mechanisms Ellipsis and influencing factors		
28		Final Exam	(naming heterocyclic compounds) Final Exam		

11.Course Evaluation

First Semester 25 Degree(Exam to the tasks assigned to the student such as daily preparation, daily oral, monthly), Semester 25 Degree. Final Exam 50 Degree.

12.Learning and Teaching Resources

organic chemistry by Morrison and Boyd 2edition ,prentice-hall,2007

Organic chemistry by Paula Yurkanis;6 edition, prentice-hall,2010 Organic chemistry by Janice Gorzynski ;3 edition, McGraw-Hil,2011

Course Description Form

1. Course Name:					
Green chemistry					
2. Course Code:					
3. Semester / Year:					
Year					
4. Description Preparation Date:					
22/2/2025					
5. Available Attendance Forms:					
Available					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90/5					
7. Course administrator's name (mention all, if more than one name)					
Name: Hawraa Kareem Dhaef; hawraa.dheef@uobasrah.edu.iq					
Abdul Jaleel Mohammed; abduljaleel.muhammad@uobasrah.edu.iq					
8. Course Objectives					
Course Objectives			• • •		
Learn Green Chemistry and Sustainable Environment					
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Basics and Concepts Green Chemistry	Definition of green chemistry	The lecture	Monthly and annual exams

2	2	Green Chemistry Principles - Twelve Theories of Chemistry Green Sustainability	The beginnings of green chemistry The main objectives of green chemistry Development.		
3	2		Atomic Economy and Reducing Material Use		
4	2	- Corn Food Effective for Reaction Sheldon Sheldon	Solutions for Conserving Materials		
5	2	Scale Reduce Material Use	Raw Materials		
6	2		Reducing Energy Requirements		
7	2	- Chemical Solutions on Light Raw Materials from Waste Control of Catalyst Use	Exam		
8	2	Selection of Intended Protection Groups - Reduction of Non-Raw Material Use	Alternative Energy Sources		
9	2	Process Intensification			
10		- Monthly Exam	Reducing Toxicity		
11		Energy Generation Extensive Process Energy Usage of Energy Sources	(Risk Reduction)		
12		Microwave Transmission			
13		Industrial Target Ultrasonic Transmission			
14		Electrochemical Target To Compensate	Hoag-Sterner Scale		

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Industrial chemistry is the branch of science that explores the chemical processes within and related to living organisms. It is a laboratory based science that brings together biology and chemistry. By using chemical knowledge and techniques, biochemists can understand and solve biological problems. As the broadest of the basic sciences, biochemistry includes many subspecialties such as w

1. University Department/Centre Chemistry

2. Course title/code Industrial chemistry

3. Program(s) to which it contributes

4. Modes of Attendance offered

5. Semester/Year yearly

6. Number of hours tuition (total) 48

7. Date production/revision of this
specification **24/2/2024**

8. Aims of the Course

The primary objectives of the Industrial chemistry major are:

- 1- Explain to the student the importance of petrochemical industries
- 2- Explains the method of refining petroleum and the chemical transformations and processes of petroleum distillates phenomena through the scientific method.
- 3- The student will gain theoretical experience in the origin of petroleum and natural gas and their physical and chemical properties

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Explaining to the student the importance of industrial chemistry in our daily lives.

A2. 2 Characterize the main processes in the petrochemical industries.

A3. Conducts practical experiments related to petroleum chemistry, catalyst preparation, and reactions Catalytic and hydrocarbon analyses

A4. Explains the problems associated with the petrochemical industries and provides practical solutions to them higher thinking skills: analyzing, interpreting and discussing results and information

B. Subject-specific skills

Biochemists should also possess the following specific skills:

1. Analytical skills.
2. Communication skills.
3. Critical-thinking skills.
4. Interpersonal skills.
5. Math skills.
6. Perseverance.
7. Problem-solving skills.

Teaching and Learning Methods

1. Choose the teaching tool.
2. Each lecture counts, especially.
3. Keep your lecture up to date.
4. Diversify your teaching methods: a) The bilingual teaching. b) The multimedia teaching.
4. Try to make your more interesting.
5. Use analogy or comparison, make.
6. Introduce memorization tricks.

Evaluation methods

- 1- Quick exams Quiz.
- 2- Questions and discussions during the lecture and class contributions.
- 3- Oral exams.
- 4- Quarterly written exams.
- 5- Final written exams.
- 6- Homework..

11. Course Structure

First course					
Hours	Week	IOLs	Topic title	egnths T mestem	nnemess mestem
2	1	History of petroleum	Theory, crude treatments Nature of petroleum,	Theoretical	Questions and discussions
2	2	Chemical processes	Petroleum classification & evaluation	Theoretical	Questions and discussions
2	3	Chemical processes in oil refining	Catalytic alkylation	Theoretical	Questions and discussions
2	4	Chemical processes in oil refining	Catalytic isomerization & refining	Theoretical	Questions and discussions
2	5	Chemical processes in oil refining	Thermal cracking processes	Theoretical	Questions and discussions
2	6	Chemical processes in oil refining	Catalytic Thermal cracking processes	Theoretical	Questions and discussions
2	7	Petroleum products	Gasoline and other products & octane number	Theoretical	Quick exams
2	4	Petrochemical industries	Ethylene, ethylene glycol, styrene, propylene, polypropylene	Theoretical	Quick exams
2	9	Petrochemical industries	Acronitrile, isopropyl alcohol, cumin	Theoretical	Questions and discussions

2	11	Petrochemical industries	Acetone, isoprene, butadiene, acetylene.	Theoretical	Quick exams
2	11	Petrochemical industries	Butyl and isobutyl alcohol, propyl oxide, acrolein	Theoretical	Questions and discussions
2	12	Oxidation in petrochemical industries	Oxidation involving free radicals in the liquid phase	Theoretical	Quick exams
2	13	Oxidation in petrochemical industries	Oxidation of cumene to produce phenol and acetone, oxidation of toluene to produce phenol	Theoretical	Questions and discussions
2	14	Oxidation in petrochemical industries	phenol from benzene sulfonate, phenol from chlorobenzene	Theoretical	Quick exams
Second course					

2	17	Oxidation in petrochemical industries	Oxidation to produce terephthalic acid and its derivatives	Theoretical	Questions and discussions
2	18	Oxidation in petrochemical industries	Industrial methods for producing dimethyl terephthalate, oxidation for producing adipic acid	Theoretical	Quick exams
2	19	Oxidation in petrochemical industries	Oxidation to produce acetic acid, oxidation involving free radicals in the gas phase	Theoretical	Questions and discussions

2	20	Oxidation in petrochemical industries	Oxidation in the liquid phase not involving free radicals. Oxidation in the gas phase using heterogeneous catalysts.	Theoretical	Questions and discussions
2	21	Oxidation in petrochemical industries	Industrial methods for producing anhydrous phthalic and anhydrous malic acid	Theoretical	Questions and discussions
2	22	Aromatic hydrocarbons and their derivatives	Production of aromatic compounds, separation and purification of aromatic compounds, industrial processes for producing benzene	Theoretical	Questions and discussions
2	22	Aromatic hydrocarbons and their derivatives	Toluene, xylene, bisphenol	Theoretical	Questions and discussions
2	24	Aromatic hydrocarbons and their derivatives	Nitration & sulphonation	Theoretical	Quick exams
2	22	Aromatic hydrocarbons and their derivatives	Industrial detergents	Theoretical	Quick exams
2	22	Preparation of halogen compounds	Preparation of halogen compounds	Theoretical	Quick exams
2	21	Fertilisers	Fertilisers	Theoretical	Quick exams

2	21	Water	Water hardness and treatment	Theoretical	Quick exams
2	21	the glass	Glass industry	Theoretical	Questions and discussions
2	22	Corrosion	Corrosion	Theoretical	Questions and discussions
2	27	Corrosion	Corrosion treatment	Theoretical	Quick exams

11. **Infrastructure Required reading:**

- 1-polymer chemistry.
- 2-Industrial chemistry

Special requirements (include for example workshops, periodicals, IT software, websites)

Provide scientific workshops, English ebooks (pdf), Industrial chemistry websites, and learning new software to help postgraduate students improve their skills

Community-based facilities (include for example, guest, lectures, internship, field, studies)

Request a scientific collaboration with some Industrial chemistry specialists to develop postgraduate skills by providing new instruments and developing laboratory experiments.

13. Admissions

Minimum number of students: 80

Maximum number of students: 150

Course Description Form

1. Course Name:					
Scientific research methodology					
2. Course Code:					
3. Semester / Year:					
Year					
4. Description Preparation Date:					
22/ 02/ 2024					
5. Available Attendance Forms:					
In-person only					
6. Number of Credit Hours (Total) / Number of Units (Total)					
60 hours per year. 2 hours per week					
7. Course administrator's name (mention all, if more than one name)					
Name: Maitham Najim Aboud					
Email: maytham.abbood@uobasrah.edu.iq					
8. Course Objectives					
1- The student learns the scientific research methodology			•		
2- The student learns how to obtain sources			•		
3- The student learns how to write scientific research			•		
4- The student learns how to present and publish scientific research			•		
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 hours	1- Provide students with the skill analyzing information	Scientific research methodology	Explaining the scientific material by presenting examples 2- Clarifying the basic points for finding sources and how to get them	Weekly, monthly, daily, written and end-of-year exams.
2	2 hours				
3	2 hours				
4	2 hours				
5	2 hours				
6	2 hours				
7	2 hours				

8	2 hours	Learning		from them to	
9	2 hours	steps of wri		write the	
10	2 hours	scientific		scientific rese	
11	2 hours	research 3- H		3- How to rev	
12	2 hours	to use differ		the informat	
13	2 hours	methods		obtained	
14	2 hours	presenting			
15	2 hours	information			
Holiday	Holiday				
16	2 hours				
17	2 hours				
18	2 hours				
19	2 hours				
19	2 hours				
20	2 hours				
21	2 hours				
22	2 hours				
23	2 hours				
24	2 hours				
25	2 hours				
26	2 hours				
27	2 hours				
28	2 hours				
29	2 hours				
30					

11. Course Evaluation

Distribution as follows: 25 marks for monthly and daily exams for the first semester. 25 marks for monthly and daily exams for the second semester. 50 marks for final exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Prof. Dr. Jabbar Khattar Al-Zawwar, Scientific Research Methodology - 2014. Dr. Younis Krou Al-Azzawi, Introduction to Scientific Research Methodology, 2008. Dr. Kamal Dashli, Scientific Research Methodology, 2016.
Main references (sources)	Dr. Imad Khalil Eidan, Rules and Foundations of Quotation and Documentation in Scientific Research, 2021. A, Nabila Brik, Dr. Salaf Mashri, Controls of Quotation and Respect for Intellectual Property, 2019..
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Academic Program Description

Forth Stage

Course Description Form

1. Course Name: Physical Chemistry					
2. Course Code:					
3. Semester / Year: Year					
4. Description Preparation Date: 24/2/2024					
5. Available Attendance Forms: Attendance only.					
6. Number of Credit Hours (Total) / Number of Units (Total) 44, 2 hourse weekly.					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Bahjat Ali Saeed					
Email: bahjat.saeed@uobasrah.edu.iq					
8. Course Objectives					
A1- Explain to the student the following The importance of quantum chemistry in understanding the universe. There are two principles to explain the nature of energy: the principle of continuous energy and quantized energy, the principle of quantized energy is the correct principle. A3- The most important equations on which class mechanics and quantum mechanics are based. A4- How to derive the Schrodinger equation. A5- Principle quantum mechanics. A6- How to use quantum mechanics in studying and interpreting molecular spectra.					
9. Teaching and Learning Strategies					
Strategy					
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the structure bodies and v surrounds	Physical Chemistr	Learning method	Monthly exams and the end-of-year exam
2	2			Explaining scientific material b	
3	2				

4	2	humans		on	
5	2	understandin		available	
6	2	the theore		methodolog	
7	2	foundations		and auxil	
8	2	necessary		books	
9	2	explain chem			
10	2	composition			
11	2				
12	2				
13	2				
14	2				
15	2				
Holid					
16	2				
17	2				
18	2				
19	2				
20	2				
21	2				
22	2				

11. Course Evaluation

As follows: 25 marks for monthly and daily exams for the first semester. 25 marks for monthly and daily exams for the second semester. 50 marks for final exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Quantum Chemistry a Molecular Spectroscopy
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Basics of Quantum Chemistry
Electronic References, Websites	

Course description form

Description of the organic diagnosis course for the fourth stage

The course is divided into several chapters for the first and second semesters. The subject of spectroscopic organic diagnosis deals with the basic principles of diagnosis in addition to the use of modern techniques and spectroscopic methods in organic diagnosis, which are: Infrared spectroscopy, nuclear magnetic resonance spectroscopy, ultraviolet and visible spectroscopy, and finally mass spectroscopy, where the topic deals with a description of each technique, its scientific basis, and the composition of the gases, taking multiple models of spectra and teaching students how to benefit from them in knowing the chemical composition of the compound. In addition to linking the four techniques to extract the composition of an unknown substance. As for the practical part, it is a diagnosis using the classical methods used for the purpose of knowing the composition of the unknown substance.

University of Basra/ College of Education for Pure Sciences	Educational institution .1
Chemistry	Scientific department/center .2
Organic diagnosis	Course name/code .3
Official working days	Available forms of attendance .4
Annual/fourth stage	Semester/year .5
46	Number of study hours (total) .6
	The date this description is prepared .7
Course objectives .8	
Explaining to the student the importance of organic diagnosis in our daily lives	
The student gains understanding and understanding of the course chapters through the presentation provided by the instructor.	

The student gains experience in interpreting spectra and components of the devices used.

Knowing and distinguishing different organic compounds through their spectra.

Course outputs, teaching, learning and evaluation methods

Knowledge goals

- A- A clarification of the student is the importance of organic diagnosis in our daily life.
- B- Explanation of the student how to interconnected organic compounds.
- C- A clarification of the student is the most important chemical and physical characteristics of each type of organic chemistry.
- D- Explanation of the student how to take advantage of the diagnosis in detecting the installation of materials.
- E- Connecting diagnosis and detection of the purity of materials, especially pharmaceutical or non-pure

The skills goals of the course.

- A - The student acquires the experience of the role and importance of the classes in our daily life.
- B- The student acquires experience in distinguishing between the items of organic compounds m during the diagnosis and the control.
- C - The student acquires an experience in how to link spectral techniques by extracting the installation.

Teaching and learning methods

- 1- Theoretical lectures.
- 2- Practical lectures.
- 3- Use the display screen to meet the lectures.
- 4- Guiding the student to the websites to benefit from them.
- 5- The student's guidance to the sources that were organized on the basis of the lectures.

Evaluation methods

- 1- Weekly editorial exams.
- 2- Questions during the lecture.
- 3- Confidential editorial exams.
- 4- Final examinations.
- 5- Quiz fast exams.

Public and rehabilitation skills (other skills related to employment and personal development).
The student's acquisition of experience in how to deal with spectra, interpret her, and extract information from them, which is essential and specific, to develop the student's ability to complete postgraduate studies for master's and doctorate.

The course development plan

Add practical scientific laboratories that link theoretical to the practical so that the students fully benefit in theoretical and practical and inserting sub -infrared devices to the laboratories to connect the practical to the theory.

Infrastructure

- 1- The required books required: **Organic Chemistry**, Dr. Muhammad Shaker
- 2- The main references (sources) **Introduction of Spectroscopy** : Donald L. Pavia
- 3- The books and references recommended (scientific journals, reports,etc)
- 4- There is no specialized book in Arabic, so we recommend that we translate the Pavia book because it is a comprehensive book for organic diagnosis.

Rapporteur structure

Evaluation methods	Teaching method	Unity Name / Or Topic	Required learning outcomes	Hours	Week
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	A neighborhood through which electromagnetic radiation, radiation types, frequencies, wavelengths are clarified and their energies	Electromagnetic radiation	2	1
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Learn about energy levels and how the electronic transition occurs and the vulnerability depends on the powerful energy	Electronic transfers between the levels	2	2
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	A basic and detailed explanation of this infrared rays and how to benefit from it in the spectra	Infrared	2	3
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	A detailed clarification to an infrared technique that deals with the scientific basis and an explanation of the Hijazar spectra and how to divide the frequencies	Redly	2	4
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	An explanation of the Hook and its derivation law and the relationship between the constant of the power of the basis and the scattered block with the frequency	Hook Law	2	5
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods	Each group is effective	Explain the ribs of the stretching and bending that occurs due to the infrared radiation	2	6

	+Dialogue and discussion Lectures				
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	Where it is divided into several homogeneous and incomplete types in addition to the number of bends that urge a specific group and the difference between written and non -linear molecules in the number of vibration patterns	Interpretation of a spectrum under the red	2	7
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	Where the spectrum is divided into two regions, the first is vibrating and clarifying the location of each effective group and the other region, which is the fingerprint with the explanation of the types of vibratory beams and how to distinguish between a job group and another	Various examples of sub -shades	2	8
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	Various types of sub -shades are displayed, the interpretation of each spectrum, and the chemical composition is extracted.	Magnetic nuclear resonance	2	9
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	A general explanation of technology and radio radiology and how electronic transition is done	Factors affecting chemical displacement	2	10
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	Where the factors affecting the chemical displacement are clarified, through which it is possible to distinguish between the types of bronons in the organic molecule	Doubt and environments	2	11
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods +Dialogue and discussion Lectures	Where the types of environments in which the proton is clarified and how duplication occurs between protons and distinguish between them	Examples of resonance	2	12

Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	View a set of spectra and student education on how to extract information from the spectrum and determine the type of installation	Connecting infrared and magnetic nuclear resonance	2	13
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Examples show Keqia extracting an unknown material through the spectra	Carbon magnetic nuclear resonance	2	14
Half a year holiday					
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Half a year holiday	Ultraviolet conquest	2	15
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Introduction to ultraviolet and electronic transfers and explaining the Bir Lambert Law	Visual	2	16
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Electronic transfers and their types between electronic orbits, the permitted statement, location, and wavelengths of each transition	Types of electronic transfers	2	17
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion	How the electronic transition and the factors affecting the red and blue displacement occurred	Effecting Factors on electronic transfers	2	18

	Lectures				
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Where the nature of the transfers is clarified in the visible spectra and the relationship between the absorbed light and the color	Smalls of the visual area	2	19
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Where types of examples are displayed on the electronic spectra of the visible area and above purple and information is extracted from the spectrum	Examples of electronic spectra	2	20
Daily, monthly, and final tests, and daily reports	Lectures Theoretical and practical + Display methods + Dialogue and discussion Lectures	Where the sub -shades are displayed, nuclear resonance, and electronic drums for an unknown compound only the formula of positivism, and through the interpretation of each type of spectra and linking it, we can know the chemical composition of the unknown boat	Applications	2	21

Course Description Form

1. Course Name: Environmental pollution	
2. Course Code:	
3. Semester / Year: Year	
4. Description Preparation Date: 23/2/2024	
5. Available Attendance Forms: Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
7. Course administrator's name (mention all, if more than one name)	
Name: Hanan Murtada Ali Email: hanaan.murtada@uobasrah.edu.iq	
8. Course Objectives	
1- Explain to the student the importance of recognizing the seriousness of environmental pollution in our lives. And clarify the most important modern ideas in understanding the natural and industrial environmental pollution of air, water and soil, as well as noise pollution and the causes of each of these types and control them. 2- Providing students with the skill of developing constructive concepts and ideas to reach the crystallization of knowledge among students about trying to control various types of pollution or reduce their impact. 3- The student acquires the understanding, awareness and ability to clarify the prescribed classes through the presentation provided by the teacher. 4- Knowing and distinguishing different chemical compounds in the course chapters and thus identifying what is useful and harmful to the environment. 5- The student acquires theoretical experience in dealing with the safety of his environment and how to avoid various diseases and environmental disasters. 6- Finding new solutions to get rid of pollution through discussions, construction and writing reports on various topics on pollution.	• • •
9. Teaching and Learning Strategies	

Strategy	1- Education strategy using the cooperative concept. 2- Education strategy by developing a series of observations and logical thinking to solve problems. 3- Education strategy by developing solutions and linking the theoretical concept with practical application intelligently.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Environmental pollution and its relationship to the natural balance.	Clarifying the concept of pollution, its definition and types with examples and observations.	Theoretical	Quick exams
2 and 3	4	Air pollution	Its definition, types, air components, the cross-effects of its components, and the consequent environmental disasters.	Theoretical	Quick exams
4	2	Diseases resulting from air pollution.	Types and causes	Theoretical	Quick exams
5	2	Some natural phenomena.	Their effects on the environment	Theoretical	Quick exams
6	2	Air pollution by radiation.	Its definition and effects on living organisms and the environment	Theoretical	Quick exams
7	2	Air pollution with oxides	its destructive effects on humans – property and plants	Theoretical	Quick exams

			and ways to control them		
8 and 9	4	Water pollution	Definition, types and basic water pollutants	Theoretical	Quick exams and provide a theoretical report on a specific environmental problem.
10 and 11	4	Methods used to measure the amount of pollutants consuming oxygen.	Their importance and types, a comparison between the two methods, a discussion of the submitted report with students and some observations	Theoretical	Quick exams
12	2	Aerobic and anaerobic bacteria.	Their types, their relationship to the methods used, and the chemical equations for each of them	Theoretical	Quick exams
13	2	Water pollution with washing powders.	Its types, mechanism of action, the effect of the activating agent on it, and how to control this type of pollution	Theoretical	Quick exams
14	2	Water pollution with crude oil and petroleum materials and water pollution with radiation.	Definition, causes and methods of control	Theoretical	Quick exams

Midyear holiday					
17	2	Thermal pollution of water and pollution with suspended materials and sediments.	Explained in detail	Theoretical	Quick exams
18	2	Water pollution with mineral acids, water pollution with salinity and water pollution with disease germs.	Explained in detail	Theoretical	Quick exams
19	2	Application			
20	2	Application			
21	2	Application			
22	2	Application			
23	2	Application			
24	2	Application			
25	2	Water pollution with radioactive materials and the generation of electrical energy by nuclear fuel.	Explained in detail	Theoretical	Quick exams
26 and 27	4	Methods of controlling water pollutants.	Explained in detail	Theoretical	Quick exams

28 and 29	4	Solid waste pollution.	Definition, types, importance and disposal methods	Theoretical	Quick exams
30	2	Noise pollution.	Definition and types with examples and observations	Theoretical	Quick exams
31	2	Causes of noise pollution and methods of noise control.	Explained in detail with a presentation of some related pathological conditions	Theoretical	Quick exams

11. Course Evaluation

The distribution is as follows: 25 degrees monthly and daily exams for the first semester. 25 degrees monthly and daily exams for the second semester. 50 marks for final exams.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Dr. Latif Hamid Ali, Industrial pollution sources, Pollution Chemistry, Control Methods, 1987.
Main references (sources)	1- Dr. Hamed Al-Saad (air pollution). 2- Selected articles from the net.
Recommended books and references (scientific journals, reports...)	1. J. Jeffrey P., P. Aarne V., Ruth F. W., Environmental pollution and control, 4th ed., 1997 2. Richard W. B., Donald L. F., D. Bruce T. and Arthur C. S., Fundamentals of air pollution 4th edition, 2008. 3. P. K. Goel, 2006, Water Pollution: Causes, Effects and Control. 4. D. Vallero, 2014, Fundamentals of Air Pollution 5th Edition. 5. J. Trevors, 1972 – 2017, Water, Air, & Soil Pollution. 6. Try to summarize some new articles and research related to the subject in a book to be used within the curriculum. 7. Translating articles and research on the subject and placing them in a book to be used within the curriculum.

	8. All modern electronic sources and accredited and sober magazines.
Electronic References, Websites	https://researchgate.net/ https://core.ac.uk/

15					
16		Control of Hazardous Materials	Exam		
17			Mid-Year Holiday		
18		Speaker Measurement Lethal Process Experiment	Definition of waste and waste management		
19			Waste management hierarchy		
20		Hoag Western Scale Ames Test	Reuse of waste Disappeared Recycling		
21		Mid-Year Exam	Importance of recycling		
22		Mid-Year Holiday	Recycling methods		
23			Importance of recycling		
24		Waste Reduction	Accumulated waste		
25		Waste Treatment	Dispose of waste		
		Recycling	Central processing unit website		
			Physical method		
			Chemical method		
			Anti-virus method		
			Use of catalysts		
			Importance of catalysts, types of catalysts, role of catalysts		
			Unacceptable catalysts		
			Imported catalysts		
			Acid-base catalysts		
			Oxidation-reduction catalysts		
			Polymerization catalysts		
			Enzyme catalysis		

26			Solvents and the need for solvents - Unacceptable solvents		
27		Exam	Laws and measures Regulatory Use Greener Solvents Credit Certifications Green Solvent Standards		
28		Catalysts	Workforce Gain Environment, Health and Safety Life Cycle Assessment (LCA)		
29		Solvents in Green Chemistry	Final Exam		
		Final Exam			

11. Course Evaluation

Distribution as follows: 25 marks for monthly and daily exams for the first semester. 25 marks for monthly and daily exams for the second semester. 50 marks for final exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- 4- Green chemistry: An introductory text- by Mike Lancaster
- 5- Green chemistry and processes- by Mukesh Doble

	6- Handbook of green chemistry and technology by – James Clark and Duncan Macquarrie
Main references (sources)	Hand Book of green chemistry and technology By James Clark and Duncan Macquarrie
Recommended books and references (scientific journals, reports...)	- Green Chemistry: Principles and Practice Paul Anastas * and Nicolas Eghbali - Designing for a green chemistry future JULIE B. ZIMMERMAN, PAUL T. ANASTAS, HANNO C. ERYTHROPEL, AND WALTER LEITNER.
Electronic References, Websites	

Course Description Form

1. Course Name:	
Biochemistry	
2. Course Code:	
3. Semester / Year:	
Year/ 2 rd stage	
4. Description Preparation Date:	
19/2/2025	
5. Available Attendance Forms:	
Available	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours per week (2 hours theoretical, and 2 hours laboratory)	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Khansaa Saqr Saud Email: kh.sa830@yahoo.com	
8. Course Objectives	
Course Objectives	Carbohydrates Lipids Amino acids, peptides, and proteins Enzymes Vitamins Nucleic acids
9. Teaching and Learning Strategies	
Strategy	The teaching and learning strategy based on two tools, Power point presentation and white board. Which can provide a sufficient information and knowledge to postgraduate students, and achieve the target of biochemistry science.
10. Course Structure	

First semester					
Hours	Week	IOLs	Topic title	egntisa T mestem	Annemess mestem
4	1	Introduction to carbohydrates	Carbohydrates	Theoretical	Quick exams
4	2	Chemical structures, types, functions	Monocarbohydrate	Theoretical	Quick exams
4	3	Chemical reactions	Monocarbohydrates	Theoretical	Quick exams
4	4	Chemical structures, types, functions	Oligocarbohydrates	Theoretical	Quick exams
4		Chemical structures, types, functions	Polycarbohydrates	Theoretical	Quick exams
4	5	Introduction to lipids	Lipids	Theoretical	Quick exams
4	7	Types of lipids and their reactions	Classification of lipids	Theoretical	Quick exams
4	4	Types of lipids and their reactions	Classification of lipids	Theoretical	Quick exams
4	9	Types of lipids and their reactions	Classification of lipids	Theoretical	Quick exams
4	11	Types of lipids and their reactions	Classification of lipids	Theoretical	Quick exams
4	10	Introduction to amino acids and chemical structures, functions, reactions	Amino acids	Theoretical	Quick exams
4		Introduction to peptides ,chemical structures, functions,synthesis methods	Peptides	Theoretical	Quick exams
4		Introduction to proteins, classifications and functions	Proteins	Theoretical	Quick exams
4	17	Types and functions	Structures of protein	Theoretical	Quick exams

Second semester

4	18	Introduction to vitamins, functions	Vitamins	Theoretical	Quick exams
4		Classification, chemical structures, functions	Soluble vitamins in water	Theoretical	Quick exams
4		Classification, chemical structures, functions	Soluble vitamins in lipids	Theoretical	Quick exams
4	19	Introduction to enzymes, The relation with human health	Enzymes	Theoretical	Quick exams
4		Names and functions	Classification of enzymes	Theoretical	Quick exams
4		The importance of factors on enzyme kinetics	Kinetic properties of enzymes	Theoretical	Quick exams
4		Theoretical used to explain mechanism of enzyme functions	Mechanisms of enzyme functions	Theoretical	Quick exams
4	20	Definition, factors, functions, examples	Inhibitors	Theoretical	Quick exams
4	21	Introduction, function, nitrogen bases	Nucleotides	Theoretical	Quick exams

4		Structure, types, function	Nucleic acids	Theoretical	Quick exams
4	30	Chemical structure, function, properties	DNA	Theoretical	Quick exams

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 (curriculum books, if any)	Introduction to biochemistry By Dr. Khawla Ahmed, 1980
Main references (sources)	Biochemistry by Dr. Abbas Dawas, 2020
Recommended books and references (scientific journals, reports...)	1- خولة احمد ال فليح (مدخل الى الكيمياء الحياتية). 2- عباس دواس المالكي (الكيمياء الحياتية). 3- قيس عطوان الكيلاني (الكيمياء الحيوية).
Electronic References, Websites	