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

chemistry department

2024

## 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.

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#### **Concepts and terminology:**

<u>Academic Program Description</u>: 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.

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

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

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

<u>Curriculum Structure</u>: 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.

<u>Teaching and learning strategies</u>: 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.

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#### Academic Program Description Form

University Name: University of Diyala Faculty/Institute: College of Education for Pure Sciences Scientific Department: Department of Chemistry

Academic or Professional Program Name: 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: Head of Department Name: Le.Dr.Abd alkarem fadel Date:

#### Signature:

Scientific Associate Name: Prof. Dr. Khansa Farman Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

#### 1. Program Vision

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

#### 2. Program Mission

Work on managing and graduate efficient students with high management and scientific in chemistry, and develop the aptitude in scientific research that brings benefit to 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 aspects of the student and spreading the spirit of

#### 4. Program Accreditation

No

## 5. Other external influences

6. Program Structure								
Program Structure	Number of	Credit hours	Percentage	Reviews*				
	Courses							
Institution	8	20	10.75					
Requirements								
College Requirements	11	40	21.5					
Department	24	128	68.8					
Requirements								
Summer Training	1	4	2.15					
Other								

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

7. Program Descript	ion			
	Course Code	Course Name	Credit	: Hours
Year/Level 2023-2024			theoretical	practical
	Analytical chemistry 1	CHEM111	2	2
	organic chemistry1	CHEM121	2	2
	Inorganic chemistry1	CHEM131	2	0
	Chemical safety and security	CHEM181	2	0
	Analytical chemistry 2	CHEM112	2	2
	organic chemistry2	CHEM122	2	2
The first stage	Inorganic chemistry2	CHEM132	2	0
	biology	BIO120	2	2
	Educational psychology	EPS120	2	0
	Foundations of education	EPS101	2	0
	English	UOA140	2	0
	Human rights	UOA135	2	0
	and			
	democracy			
	Arabic	UOA137	2	0
	Computer Science	UOA141	1	2
	Calculus 1	MAT105	2	0
	Calculus 2	MAT113	2	0

	Course Code	Course Name	Cre	edit Hours
Year/Level 2023-2024			theoretical	practical
	Analytical chemistry 3	CHEM213	2	2
	organic chemistry3	CHEM223	2	2
	Inorganic chemistry3	CHEM233	2	2
	Physical chemistry1	CHEM241	2	2
	Analytical chemistry 4	CHEM214	2	2
	organic chemistry4	CHEM224	2	2
	Inorganic chemistry4	CHEM234	2	2
the second stage	Physical chemistry2	CHEM242	2	2
	Educational psychology	EPS202	2	0
	Educational administration	EPS201	2	0
	Scientific research method	EPS211	2	0
	English	UOA240	2	0
	Computer Science	UOA241	1	2
	mathematics	MAT	2	0

	Course Code	Course Name	Cre	dit Hours
Year/Level 2023-2024			theoretical	practical
	Analytical chemistry 1	CHEM351	2	2
	organic chemistry5	CHEM325	2	2
	Inorganic chemistry5	CHEM331	2	2
	Physical chemistry3	CHEM341	2	2
	Industrial chemistry1	CHEM361	2	0
	Biochemistry1	CHEM352	2	2
	organic chemistry6	CHEM326	2	2
The Third stage	Inorganic chemistry6	CHEM332	2	2
	Physical chemistry4	CHEM342	2	2
	Industrial chemistry2	CHEM362	2	0
	Teaching curricula and methods	EPS311	2	0
	Counseling and mental health	EPS312	2	0
	English3	UOA340	2	0

	Course Code	Course Name	Cr	edit Hours
Year/Level 2023-2024			theoretical	practical
	Biochemistry3	CHEM453	2	0
	Organic diagnosis1	CHEM427	2	2
	Instrumental analysis chemistry1	CHEM415	2	2
	Quantum chemistry	CHEM445	2	0
	Industrial chemistry3	CHEM463	2	2
	Biochemistry4	CHEM454	2	0
	Organic diagnosis 2	CHEM428	2	2
The Fourth stage	Instrumental analysis chemistry2	CHEM416	2	2
	Quantum chemistry	CHEM446	2	0
	Industrial chemistry4	CHEM464	2	2
	Measurement and evaluation	EPS411	2	0
	Teaching applications	EPS412	2	0
	School applications	EPS413	0	4
	Graduation Project	CHEM491	2	0

		Curricu	lum	skills	chart										
					Learning outcomes required from the programmer										
Year	Course	Course	Basic or optional		Know	ledge	9		Sk	ills			Eth	nics	
	Code	Name		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	CHEM111	Analytical chemistry 1	Basic	V	$\checkmark$			$\checkmark$				$\checkmark$	$\checkmark$		
	CHEM121	organic chemistry1	Basic	V	V	V		V				V	V		
	CHEM131	Inorganic chemistry1	Basic	V	V	N		V				V	N		
First Stage	CHEM181	Chemical safety and security	Basic	V	V	V		V				$\checkmark$	V		
	CHEM112	Analytical chemistry 2	Basic	$\checkmark$	$\checkmark$			$\checkmark$							
	CHEM122	organic chemistry2	Basic	$\checkmark$	$\checkmark$	V		$\checkmark$				V	V		
	CHEM132	Inorganic chemistry2	Basic	V	$\checkmark$	V		V				$\checkmark$	V		
	BIO120	biology	Basic		$\checkmark$			$\checkmark$					$\checkmark$		
	EPS120	Educational psychology	Basic												
	EPS101	Foundations of education	Basic				V			$\checkmark$				V	
	UOA140	English	Basic		$\checkmark$						$\checkmark$				
	UOA135	Human rights and democracy	Basic				V			V				V	
	UOA137	Arabic	Basic												$\checkmark$
	UOA141	Computer Science	Basic		$\checkmark$						$\checkmark$				
	MAT105	Calculus 1	Basic			$\checkmark$							$\checkmark$		$\checkmark$
	MAT113	Calculus 2	Basic						$\checkmark$						

			lum s	kills o	hart										
	Decis of						Learning outcomes required from the programmer								•
			Basic or												
			optional		Know	ledge	Ę		Sk	IIIS			Etr	NICS	
Year	Code	Course Name		Δ1	٨2	٨2	Δ.1	<b>P</b> 1	<b>P</b> 2	<b>B</b> 2	D/	C1	<u> </u>	<u>(</u> 2	C4
	CHEM213	Analytical	Basic	A1 √	AZ √	AS √	A4		DZ	52	04	VI √	√ V	CS	C4
		chemistry 3											,		
	CHEM223	organic	Basic												
		chemistry3													
	CHEM233	Inorganic	Basic		$\checkmark$										
		chemistry3		,	,			,				,	,		
	CHEM241	Physical	Basic	V	$\checkmark$	N		V				V	N		
	011534944	chemistry1	Desia												
	CHEM214	Analytical	Basic	N	N	N		N				N	N		
the	CHEM224	organic	Basic												
second		chemistrv4											,		
stage	CHEM234	Inorganic	Basic												
		chemistry4													
	CHEM242	Physical	Basic	$\checkmark$	$\checkmark$										
		chemistry2					,				,	,			
	EPS202	Educational	Basic				V				V	N			
	500201	psychology	Basic				2			2					2
	EPSZUI	administration	Dasic				v			v					v
	EPS211	Scientific	Basic												
		research													
		method													
	UOA240	English	Basic		$\checkmark$						$\checkmark$				$\checkmark$
	UOA241	Computer	Basic												
		Science		,	,	,		,	,				,		
	MAT	mathematics	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$				$\checkmark$		

			Curriculum	n skill	s cha	rt									
	Pasis or					ing o	utcor	mes r	equir	ed fr	om tl	he pr	ograr	nmer	•
Year	r Course Course Name		Basic or optional Course Name			Knowledge Skills							Etł	nics	
	Code			A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	CHEM351	Analytical chemistry 1	Basic	$\checkmark$	$\checkmark$			$\checkmark$				$\checkmark$	$\checkmark$		
	CHEM325	organic chemistry5	Basic		$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM331	Inorganic chemistry5	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM341	Physical chemistry3	Basic	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM361	Industrial chemistry1	Basic	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM352	Biochemistry1	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
The Third	CHEM326	organic chemistry6	Basic		$\checkmark$	$\checkmark$			$\checkmark$			V			
stage	CHEM332	Inorganic chemistry6	Basic	V	$\checkmark$			V				$\checkmark$	$\checkmark$		
	CHEM342	Physical chemistry4	Basic	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM362	Industrial chemistry2	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	EPS311	Teaching curricula and methods	Basic				V			V	V			$\checkmark$	
	EPS312	Counseling and mental health	Basic				V			$\checkmark$				$\checkmark$	
	UOA340	English3	Basic		$\checkmark$						$\checkmark$				

			Curriculu	um sk	cills cl	nart									
					Learr	ing o	utco	mes r	equir	red fr	om tl	he pr	ograr	nmer	•
Year	Year Course Course Name		Basic or optional		Know	ledge	5		Sk	ills		Ethics			
	Code			A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	CHEM453	Biochemistry3	Basic						$\checkmark$			$\checkmark$			
	CHEM427	Organic diagnosis1	Basic	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$			
	CHEM415	Instrumental analysis	Basic	V	1			V	V			V	V		
	CHEM445	Quantum chemistry	Basic	V	V	V		V	V			V	V		
The	CHEM463	Industrial chemistry3	Basic	V	V	V		V	V			V	V		
stage	CHEM454	Biochemistry4	Basic	V	V	N		V	V			V	N		
	CHEM428	Organic diagnosis 2	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM416	Instrumental analysis chemistry2	Basic	$\checkmark$	$\checkmark$	V		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM446	Quantum chemistry	Basic	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	CHEM464	Industrial chemistry4	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	EPS411	Measurement and evaluation	Basic												
	EPS412	Teaching applications	Basic							V	V				
	EPS413	School applications	Basic			,		,		$\checkmark$	$\checkmark$		,		$\checkmark$
	CHEM491	Graduation Project	Basic		V	$\checkmark$		$\checkmark$					$\checkmark$	$\checkmark$	

#### 8.Expected learning outcomes of the program

#### Knowledge

1. The student's knowledge of the electronic structure of atoms

2. Introducing the student to the periodic properties of atoms.

3. Understand the meaning of covalent bonding between atoms.

4. The student's understanding of the nature of ionic compounds in terms of their formation and solubility.

5. Introducing the student to Lewis structures, polyatomic molecules, and molecular geometry.

6. The student knows how to form molecular orientals.

7. The student's understanding of the topic of hybridization and the theory of equivalence.

#### Skills

1. That the student masters writing the electronic structure of each atom

2. Distinguish between group and period and the properties of some elements in the periodic table

3. Distinguish between ionic bonding and covalent bonding

4. Teaching the student how to write the Lewis structure for polyatomic molecules

5. Exercise the student on how to draw geometric shapes for covalent molecules

#### Ethics

1. Preparing qualified cadres to contribute to the comprehensive development and development that Iraq seeks and is witnessing in various fields of chemistry.

2- The ability to support the teaching of chemistry in educational institutions, middle and high schools, vocational schools, and various educational and technical institutes.

3- The ability to provide consultations in the field of chemistry to various scientific and industrial institutions.

4- Contributing to the scientific progress of chemistry through scientific research or participation in local, Arab and international conferences.

#### 9. Teaching and Learning Strategies

1. Application method in research laboratories.

2. Adopting the method of dialogue and constructive purposeful discussion.

3. Adopting the method of trial and error.

4. Adopting multimedia in virtual classes (image, text, audio, video).

5. Adopting interactive lectures via. google meet

#### 10.Evaluation methods

- 1- Weekly written exams.
- 2- Questions during the lecture.
- 3- Quarterly written exams.
- 4- Final written exams.
- 5- Writing scientific reports.
- 6- Quick exams Quiz.
- 7- Homework.
- 8- Committees for discussing graduation projects for final-stage students.

rs							
Specializatio	on	Special Requirements/Sk applicable)	Nu ills (if tea	Number of the teaching staff			
General	Special		Sta	aff	Lecturer		
8			8				
10			10				
5			5				
0	3		3				
	rs Specialization General 8 10 5 5 0	rs Specialization General Special 8 10 10 5 5 0 3	rS Specialization Special Requirements/Sk applicable) General Special 10 10 5 0 3	Specialization       Special Requirements/Skills (if applicable)       Nu teat         General       Special       State         8       Image: State       8         10       Image: State       10         5       S       5         0       3       Image: State	Specialization       Special Requirements/Skills (if applicable)       Number teaching         General       Special       Staff         8       Image: Staff       8         10       Image: Special       10         5       Image: Special       5         0       3       Image: Special		

#### **12.Acceptance Criterion**

Firstly, the requirements for admission to the college:

1. Approval of admission requirements for students by the regulations of the Ministry of Higher Education and Scientific Research (central admission)

2. To successfully pass any special test or personal interview deemed appropriate by the college or university council.

3. To be medically fit for the specialty applied for.

Secondly, the conditions for admission to the scientific department:

1. Choose the student's desire from more than one desire, arranged according to preference.

2. High school acceptance rate.

3. The course average of the department in which the student wishes to study.

4. Absorptive capacity of the scientific department.

#### 13. The most important sources of information about the program

1. The needs of secondary and middle schools for chemistry majors.

- 2. Local trends.
- 3. Industrial and economic trends.
- 4. Studies and questionnaires.
- 5. Seminars and specialized workshops with beneficiaries.

<b>Course Description</b>	Form
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Week	Hours	Required Learning	subject name
		Outcomes	
1	2	The electronic structure of	General introduction
2	2	atom The electronic structure of atom	Atomic structure and the origin of quantum theory
3	2	The electronic structure of atom	Electromagnetic radiation, black body radiation
4	2	The electronic structure of atom	Spectrum, atomic spectrum, Bohr atom
5	2	The electronic structure of atom	Quantum numbers and atomic state symbols
6	2		1 exam
7	2	Periodic Table	Periodic table, periodic properties of elements
8	2	Periodic Table	Blocking ionization potential
9	2	Periodic Table	Electron affinity, electronegativity
10	2	Periodic Table	The sizes of atoms and ions
11	2	Periodic Table	Radii and types of forces
12	2		Exam
13	2	Chemical bond	Ionic grid energy
14	2	Chemical bond	Ionic grid energy
15	2	Chemical bond	Crystal lattice structure
16	2	Chemical bond	Lewis structures of polyatomic molecules
17	2	Chemical bond	Ringing
18	2	Chemical bond	Molecular geometry and electronic repulsion method in outer shells
19	2	Chemical bond	Molecular symmetry
20	2	Chemical bond	Molecular orbital formation
21	2		Exam
22	2	Chemical bond	Diagram of molecular orbital energies for diatomic molecules
23	2	Chemical bond	A diagram of the energy levels of molecular orbitals for triato molecules
24	2	Chemical bond	Hybridization
25	2	Chemical bond	How to determine the structure of some simple molecules
26	2	Chemical bond	Chemical bond
27	2	Chemical bond	Common bond or electronic pair bond
28	2	Chemical bond	Common bond properties
29	2		Exam
30	2		First-semester review + second-semester review

1 Course Evaluation							
First-semester grade 20% Second-semester grade: 20% Final quest score 40% Final exam score 60%							
2. Learning and Teaching Resources							
Required textbooks	Modern inorganic chemistry for the						
	first stage, part one / Dr. Basem Al-						
	Saadi.						
	Inorganic chemistry, first section / Dr.						
	Noman Al-Nuaimi, Dr. Munther Al-						
	Janabi						
Main references (sources)	Inorganic Chemistry Principles of						
	Structure and Reactivity, James. E.						
	Huheey.						
Recommended books and references	Basic Inorganic Chemistry, F.A.						
(scientific journals, reports)	Cotton, G. Wilkinson and P.L. Gauss,						
	3rd edition, John Wiley and Sons, Inc.						
	New York, 1995.						
Electronic References, Websites	Textbook, Concepts & Models of						
	Inorganic Chemistry, 2nd edition,						
	Wiley, New 2009						

## **Course Description Form**

1. Course Name:

#### Photochemistry

2. Course Code:

3. Semester / Year:

semester

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

### 7. Course administrator's name (mention all, if more than one name)

8	Course	Ohiectives
0.	Course	ODJECTIVES

Course Objectives

Strategy

- Learn about theories of light
- interpretation
- Identify electronic transfers
- Identify ways to lose energy

#### 9. Teaching and Learning Strategies

1- Lectures
2- Means of illustration such as: display screen

10. Co	10. Course Structure									
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation					
		Outcomes	name	method	method					
1	2 Theoretical	Definition photochemistry Theories interpretation of lig	Definition of photoelectric phenomenon Interpretation of the nature of ligh	lecture	weekly and monthly exams					
2	2 Theoretical	Light properties	Interpretation the properties light	lecture	weeklyand monthly exams					
3	2 Theoretical	Basicsoflight	Darber Basics	Lecture	weeklyand					

	<b></b>				
		absorption	StarkEinstein		monthly exams
		-	Basics	•	
4	2 Theoretical	Laws	Beer-Lambert la	Lecture	weeklyand
		photochemistry		-	monthly exams
5	2 Theoretical	Electronic	Definition of	Lecture	weeklyand
		construction	orbital		monthly exams
		Formation	Allotropic orbita		
		molecular orbitals	antiallergic		
			of bitals, allu		
			orbitals		
6	2 Theoretical	Transition energies	Transitions	Lecture	weeklyand
0	2 meoretical	Multiplication	hetween electror	Lecture	monthly exams
		Multiplication	levels		monenty exams
			The law		
			multiplicity		
			and knowledge		
			the state		
			of monads		
			and triplets		
7	2 Theoretical	Therelationship	Relate the type	Lecture	weeklyand
		between	transition		monthly exams
		Electronic	absorption		
		transitionsand	peaks		
		absorption bands		_	
8	2 Theoretical	Emission spectrum	Know how the	Lecture	weeklyand
		Spectrum of	emission spectru		monthly exams
		thebinary molecule	is formed		
			Study the		
			nature of		
			the spectrum		
			hinary		
			molecule		
			molecule		
9	2 Theoretical	Absorption spectru	Know how the	Lecture	weeklyand
		Stimulated emissio	absorption		monthly exams
			spectrum is form		C C
			The effect		
			stimulating ener		
			on emission		
10	2 Theoretical	Time of life of	Laws of the	Lecture	weeklyand
		irritation	age of irritation		monthly exams

Non-radiant transfetime Transfers notTransfers not112 TheoreticalDelayed fluorescen emissionSlow fluorescence phenomenon fluorescence phenomenonlecture weeklyand monthly exams112 TheoreticalDelayed fluorescen fluorescence emissionInhibition fluorescence phenomenonweeklyand monthly exams122 Theoretical radiative transitionInhibition fluorescence phenomenonLecture weeklyand monthly exams radiationweeklyand monthly exams132 Theoretical radiative transitionTransmissions radiationLecture accompanied radiationweeklyand monthly exams132 Theoretical radiative transfer mount properties of the two transfers π- n-δ*Lecture two transfers a their advantagesweeklyand monthly exams142 Theoretical Extinction of the irritated particle Throughother moleculesMethods uenching uother moleculesLecture weeklyand monthly exams15ExamExamLecture uother moleculesweeklyand monthly exams11. Course EvaluationLexamExamI12. Learning and Teaching ResourcesPhotochemistry\AssistantProfess Dr. Mohi Rasool Hammoud\Baghd 1991Main references (sources)Photochemistry\AssistantProfess Dr. Mohi Rasool Hammoud\Baghd 1991								
InterferencesTransfers not accompani by radiationweeklyand monthly exams112 Theoretical PerspectiveDelayed fluorescen phenomenon fluorescence phenomenonlecture phenomenon fluorescence phenomenonweeklyand monthly exams122 Theoretical radiationradiative transition fluorescence phenomenonInhibition fluorescence phenomenonweeklyand monthly exams122 Theoretical radiative transition radiationTransmissions accompanied radiationLecture weeklyand monthly exams132 Theoretical radiationThe transfer amount arota radiationMove quotient levers the characterist of the two transfers a their advantagesLecture weeklyand monthly exams142 Theoretical radiationExtinction of the irritated particle Throughother moleculesMethods unching other moleculesLecture weeklyand monthly exams15ExamExamI11.Course EvaluationExamI12.Learning and Teaching ResourcesPhotochemistry\Assistant Profess Dr. Mohi Rasool Hammoud\Baghd 1991Main references (sources)Photochemistry\Assistant Profess Dr. Mohi Rasool Hammoud\Baghd			Non-radiant transfe	time				
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1991				1991				
Recommended books and references (scientific	Recomm	mended books a	nd references (scientific					
	journals	, reports)						
iournals reports )	journais	, icporta)						

Electronic References, Websites

Evaluation road	road	Unit name	Outputs	hours	the
	education	the topic or	Learning		week
			required		
And verbal a test	Dialogue and	meaning	meaning	۲	١
editorial	discussion	Education	And its Education		
		And its goals	Its necessity goals		
		Its necessity			
And verbal a test	Dialogue and	Her theories	، Her theories	۲	۲
editorial	discussion	And its .	And its fields		
		fields			
And verbal a test	Dialogue and	Basis	Historical Basis	۲	٣
editorial	discussion	Historical	For education		
		For			
		education			
And verbal test a	Dialogue and	Basis	Old education	۲	٤
editorial	discussion	Historical			
		For			
		education			
And verbal a test	Dialogue and	Basis	Chinese	۲	٥
editorial	discussion	Historical	education		
		For			
		education			
And verbal a test	Dialogue and	Basis	Greek education	۲	٦
editorial	discussion	Historical			
		For			
		education			
And verbal a test	Dialogue and	Basis		*	V
editorial	discussion	Historical		,	, v
		Tistorical	Medieval		

		For	education		
		advastion	cutcation		
And souls all a start	Diala area area		Auchie Education		
And verbal a test		Basis	Arabic Education	•	^
editorial	discussion	Historical	And Islam before		
		For	Islam after		
		education			
And verbal a test	Dialogue and	Basis	Education	۲	٩
editorial	discussion	Historical	Modern		
		For			
		education			
And verbal a test	Dialogue and	Social Basis	Relationship	۲	۱.
editorial	discussion	For	between		
		education	And Education		
			society		
And verbal a test	Dialogue and	Social Basis	Relationship	۲	11
editorial	discussion	For	The between		
		education	And individual		
			environment the		
And verbal a test	Dialogue and	Social Basis	Education	۲	١٢
editorial	discussion	For	Congenital		
		education			
And verbal a test	Dialogue and	Social Basis	Education	۲	١٣
editorial	discussion	For	،family		
		education			
And verbal a test	Dialogue and	Social Basis	Education	۲	١٤
editorial	discussion	For	،patriotism		
		education	_		
And verbal a test	Dialogue and	Social Basis	Health Education	۲	10
editorial	discussion	For			
		education			
And verbal a test	Dialogue and	The	And its Education	۲	١٦
editorial	discussion	economic	in impact		

		education	Economic		
And verbal a test	Dialogue and	Basis	And exploitation	<u>۲</u>	1
editorial	discussion	Economic	Resources		, ,
editorial	uise ussion	Economic	Natural		
		n'or	i vacuiai		
A 1 1 1	D'1 1	education			
And verbal a test	Dialogue and	Basis	And Education	۲	18
editorial	discussion	Scientific	in the curriculum		
		education	search		
And verbal a test	Dialogue and	The	The foundations	۲	۱۹
editorial	discussion	foundations	And Nationalism		
		Nationalism	social		
		And social			
And verbal a test	Dialogue and	in Education	in Education	۲	۲.
editorial	discussion	Perspective	Perspective		
		Islamic	Islamic		
And verbal a test	Dialogue and	Renewal	the school	۲	۲۱
editorial	discussion	Educational	Overall		
		Iraq in			
And verbal a test	Dialogue and	Renewal	Education	۲	22
editorial	discussion	Educational	methodology		
		Iraq in			
And verbal a test	Dialogue and	Renewal	Schools	۲	۲۳
editorial	discussion	Educational	Distinguished		
		Iraq in	people		
			Acceleration		
And verbal a test	Dialogue and	Education	The Accept	۲	۲ ٤
editorial	discussion	Primitive	the individual		
			environment		
			And Primitive		
			I wove how		
			itself Education		
And verbal a test	Dialogue and	Education	I have He is that	۲	70
	diaguasian	Seciel	The individual		

			Social need		
			. Certain		
And verbal a test	Dialogue and	Education	finding	۲	47
editorial	discussion	the date via	relationship		
			Consistency		
			between		
			Civilizations		
And verbal a test	Dialogue and	Education	Symmetry Means	۲	۲۷
editorial	discussion	Islamic	And consistency		
			And Thinking in		
			With what work		
			We He dictates		
			Our religion		
And verbal a test	Dialogue and	Setting Social	the Means	۲	۲۸
editorial	discussion		Social control		
			And control		
			Positivity		
And verbal a test	Dialogue and	the culture	We that Practices	۲	29
editorial	discussion	And	With it rise		
		education	I Our life during		
			Mother fell short		
			It took a long		
			time		
And verbal a test	Dialogue and	Education	I have He is that	۲	۳.
editorial	discussion	Social	The individual		
			Social need		
		1	1		1

5. Course Object	ives						
<b>Course Objec</b>	tives		1-Protecting w	vorkers i	n chemica	l laboratorie	es and chemic:
			stores from health risks and				
			dangers relate	ed to the	use of ch	emicals.	
			2-Protecting society and the environment.				
			dangerous and	d toxic d	chemicals	that could j	potentially ha
		~ .	others.				
4. Teaching and	Learning	Strategies	veloping learnin	a outcom	nes in vario	ous areas of le	earning for eac
Strategy		of t	he learning area	s shown	below	Jus areas or K	
		1-	It provides a qu	uick sum	mary of th	he knowledge	e or skills that
			course seeks to	develop			
			v- Description	OI the t	eaching st	rategies used	i in the course
			3-The methods	s used to	o evaluate	the student	in the course
		evaluate the learning outcomes in this field of study.					
		٤- Evaluation is done through extracurricular activities, wr					
			exams, oral ex	ams, and	l reports, a	and the lectur	re method is u
			in teaching.				
5. Course Structure							
5. Course Structure Week	Hour	Required	Learning Out	comes	Unit or	Learning	Evaluation
5. Course Structure Week	Hour s	Required	Learning Out	comes	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction	Hour s	<b>Required</b> Introducti	<b>Learning Out</b>	<b>comes</b> safety an	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction	Hour s hour	<b>Required</b> Introducti security a	<b>Learning Out</b> on to chemical s nd national legis	<b>comes</b> safety an slation.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction	Hour s hour	Required Introducti security an Safety in	<b>Learning Out</b> on to chemical s nd national legis	comes safety and slation.	Unit or subject name	Learning method	Evaluation method
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5. Course Structure Week introduction The first week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect	<b>Learning Out</b> on to chemical s nd national legis laboratories incl protective equip- ive tools inside	comes safety an slation. ludes: 1- ment the	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a	<b>Learning Out</b> on to chemical s nd national legis laboratories incl protective equiptive tools inside v, including rubb and a laboratory	comes safety and slation. ludes: 1- ment the per glove coat.	Unit or subject name	Learning method	Evaluation method
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5. Course Structure Week introduction The first week	Hour s hour	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a	• <b>Learning Out</b> on to chemical s nd national legis laboratories incl protective equipt ive tools inside v, including rubb and a laboratory	comes safety an slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security and Safety in I Personal p 2- Protect laboratory goggles, a	• Learning Oute on to chemical s nd national legis laboratories incl protective equiptive tools inside v, including rubb and a laboratory	comes safety and slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a	Learning Out on to chemical s nd national legis laboratories incl protective equip ive tools inside y, including rubb and a laboratory	comes safety an slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a General sa	<b>Learning Out</b> on to chemical s nd national legis laboratories incl protective equip- ive tools inside <i>a</i> , including rubb and a laboratory	comes safety and slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a General sa chemical I A- Exting	Learning Out on to chemical s nd national legis laboratories incl protective equip- ive tools inside v, including rubb and a laboratory	comes safety and slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a General sa chemical I A- Exting they break	<b>Learning Out</b> on to chemical s nd national legis laboratories incl protective equipt ive tools inside v, including rubb and a laboratory	comes safety and slation. ludes: 1- ment the ber glove coat.	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a General sa chemical I A- Exting they break B-Choose	Learning Out on to chemical s nd national legis laboratories incl protective equip- ive tools inside y, including rubb and a laboratory afety precaution laboratories incl uishing fires as c out.	comes safety and slation. ludes: 1- ment the ber glove coat. soin lude: soon as e means of aper and	Unit or subject name	Learning method	Evaluation method
5. Course Structure Week introduction The first week second week	Hour s hour Two ho	Required Introducti security at Safety in I Personal p 2- Protect laboratory goggles, a General sa chemical I A- Exting they break B-Choose extinguish clothes are	Learning Out on to chemical s nd national legis laboratories incl protective equip- ive tools inside a, including rubb and a laboratory afety precaution laboratories incl uishing fires as c out. the appropriate ning, as wood, p e different from	comes safety and slation. ludes: 1- ment the ber glove coat. s in lude: soon as e means of aper, and oils,	Unit or subject name	Learning method	Evaluation method

the third week	Two ho	different from electrical appliance and equipment.		
fourth week	Two ho	Safety precautions that must be followed when using chemicals include: 1- Protective clothing must be worn before using chemicals. 2- Absolutely not smoking, eating drinking inside the laboratory. 3- The products must be known before starting the reaction in orde to avoid any poisoning, ignition, o explosion.		
The fifth week	Two ho	Material Safety Data Sheets (MSDS): Material Safety Data Sheets are considered a basic reference for chemicals in terms of safety. The sheet is divided into 16 paragraphs.		
the sixth week	Two hours	Stability conditions of matter and interactions. Some types of risks in laboratories include: Fire, infection, contact w electrical current, gas leakage, contact with harmful chemicals, contact with hot objects.		
The seventh				
week				
The eighth we				
The ninth weel				

The tenth weel	Types of injuries in laboratories, where the student learns about: different types of injuries, such as poisoning, dizziness, nausea, allergies, headaches, suffocation, fainting, various wounds, and way to treat them.
	First month exam
The eleventh week	Symptoms of exposure to chemica include redness or itching in the eyes, difficulty breathing, ways to treat them, skin burns, headaches, and nausea. Fires: The student should be familiar with: 1- Causes of fires, fire theory, and combustion theory 2-Methods of treating it.
	Acting when a fire occurs inside the laboratory by doing some of the following: 1- Ring the alarm bells, and if there are no alarm bells, raise your voice to alert the fire and ask for help. 2- Make sure everyone leaves the laboratory. 3- Ask someone close to you to contact Civil Defense.
The twelfth we	<ul> <li>4- Make sure your way out is safe.</li> <li>First aid in case of some injuries includes: <ol> <li>If the eye is exposed to chemica</li> <li>If the skin is exposed to chemica</li> <li>If suffocation occurs due to vapo or gases.</li> <li>If chemicals are swallowed.</li> </ol> </li> </ul>
	Ways to dispose of chemical waste in a safe manner include: 1- Water-soluble chemicals:

2-Solutions of solvent	IS
The thirteenth	
week	
WCCK	
The fourteenth	
week	
the week	
Fifteenth	
6. Course Evaluation	
Distributing the score out of 100 according to the	e tasks assigned to the student such as daily
preparation°, daily oral°, monthly <sup>7°</sup> , or written exam	s <sup>٦</sup> •, reports <sup>o</sup> etc
7. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Curriculum for teaching chem
Main references (sources)	safety and security
Recommended books and references (scientific jour	nals
reports)	1010,
Electronic References, Websites	General Corporation for Technical
	Vocational Training / Kingdom of Sa
	Arabia

1. Course objectives

Study of the life-giving organic compounds found within the living cell from a structural and functional standpoint.

Course outcomes and teaching, learning and evaluation methods .٩

A- Cognitive objectives

1-Enabling the student to obtain theoretical knowledge of biochemistry

2-The student's knowledge of the basic concepts of life-giving organic compounds

3-The student's knowledge of the components and composition of carbohydrates, proteins, fats, amino acids, enzymes, and vitamins

B - The skills objectives of the course

1-The student is proficient in knowing the chemical structures of

living components and their functions in an efficient manner

2- Distinguish between nucleic acids and the role of each

3-Distinguish between types of fats, their composition and functions

4- Study of enzymes, vitamins and hormones-

Teaching and learning methods

1-Lectures include dialogue, discussions, and interrogative questions

2- Means of illustration, such as: the smart board and display of

educational videos

Evaluation methods

- 1- Oral exams
- 2-Monthly exams
  - 3- Annual exams
- C- Emotional and value goals
- 1- Adopting the method of dialogue between the student and the professor
- 2-Preparing organized reports
  - 3- Adopting the discussion method

D - General and qualifying transferable skills (other skills related to

.(employability and personal development

D1- The student's ability to work within the educational and professional work team

D 2- Positive thinking and utilizing the knowledge he has received

- D 3- The ability to deal with parties outside the university and train with them
  - D 4- That the student is able to learn and master the teaching profession

10. structure Headquarters					
Evaluatio n method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
Weekly and monthly exams	lecture	Introduction to biochemistry	Biochemistry	2hours	1
Weekly and monthly exams	lecture	Carbohydrates	Carbohydrates	2 hours	2
Weekly and monthly exams	lecture	Carbohydrates	Carbohydrates	2 hours	3
Weekly and monthly exams	lecture	Carbohydrates	Carbohydrates	2 hours	4
Weekly and monthly exams	lecture	Carbohydrates	Carbohydrates	2 hours	5
Weekly and monthly exams	lecture	Carbohydrates.	Carbohydrates	2 hours	6
Weekly and monthly exams	lecture	Amino acids and peptides	Amino acids and peptides	2 hours	7
Weekly and monthly exams	lecture	Amino acids and peptides	Amino acids and peptides	2 hours	8

Weekly and monthly examslecture Amino acids and peptidesAmino acids and peptides2 hours9Weekly and monthly examslecture ProteinsAmino acids and peptidesAmino acids and peptides2 hours10Weekly and monthly examslecture ProteinsProteins2 hours11Weekly and monthly examslecture ProteinsProteins2 hours11Weekly and monthly examslecture ProteinsT ProteinsProteins2 hours12Weekly and monthly examslecture ProteinsT ProteinsProteins2 hours13Weekly and monthly examslecture ProteinsProteins2 hours14Weekly and monthly examslecture Proteinslipids2 hours14Weekly and monthly examslecture Proteinslipids2 hours15Weekly and monthly examslecture ProteinsNucleotides and nucleic acidsNucleotides and nucleic acids2 hours16Weekly and monthly examslecture ProteinsNucleotides and nucleic acidsNucleotides and nucleic acidsNucleotides and nucleic acids2 hours17				1		1
Weekly and monthly examslecture and monthlyAmino acids and peptidesAmino acids and peptides2 hours10Weekly and monthly examslecture and monthlyProteinsProteins2 hours11Weekly and monthly examslecture and monthlyT Proteins .Proteins2 hours12Weekly and monthly examslecture and monthlyT Proteins .Proteins2 hours13Weekly and monthly examslecture and monthlylipids2 hours14Monthly examslecture and and monthlylipids2 hours14Monthly examslecture and and monthlylecture and and and monthlylipids2 hours14Meekly and monthly examslecture and and and monthlylipids2 hours15Weekly and monthly examslecture and and and and monthlyNucleotides and nucleic acidsNucleotides and nucleic acids2 hours16Weekly and and monthlylecture and and and and and and and and andNucleotides and nucleic acidsNucleotides and nucleic acids2 hours17Weekly and a	Weekly and monthly exams	lecture	Amino acids and peptides	Amino acids and peptides	2 hours	9
Weekly and monthly examslecture examsProteinsProteins2 hours11Weekly and monthly examslectureT Proteins .Proteins2 hours12Weekly and monthly examslectureT Proteins .Proteins2 hours12Weekly and monthly 	Weekly and monthly exams	lecture	Amino acids and peptides	Amino acids and peptides	2 hours	10
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Weekly and monthly examslecturelipidslipids2 hours13Weekly and monthly examslecturelipidslipids2 hours14Weekly and monthly examslecturelipidslipids2 hours14Weekly 	Weekly and monthly exams	lecture	T Proteins .	Proteins	2 hours	12
Weekly and monthly examslecture examslipidslipids2 hours14Weekly and monthly examslecture examslipidslipids2 hours15Weekly and 	Weekly and monthly exams	lecture	lipids	lipids	2 hours	13
Weekly and monthly examslecturelipidslipidslipids2 hours15Weekly and monthly examslecturelipidslipids2 hours16Weekly examslectureNucleotides and nucleic and monthly 	Weekly and monthly exams	lecture	lipids	lipids	2 hours	14
Weekly and monthly examslecturelipids2 hours16Meekly and examsInterpret of the second	Weekly and monthly exams	lecture	lipids	lipids	2 hours	15
Weekly and monthly examslectureNucleotides and nucleic acidsNucleotides and nucleic acids2 hours17Weekly andlectureNucleotides and nucleicNucleotides and nucleic acids2 hours18andandacidsnucleic acids18	Weekly and monthly exams	lecture	lipids	lipids	2 hours	16
WeeklylectureNucleotides and nucleicNucleotides and2 hours18andacidsnucleic acidsnucleic acids18	Weekly and monthly exams	lecture	Nucleotides and nucleic acids	Nucleotides and nucleic acids	2 hours	17
	Weekly and	lecture	Nucleotides and nucleic acids	Nucleotides and nucleic acids	2 hours	18

monthly exams					
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	19
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	20
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	21
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	22
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	23
Weekly and monthly exams	lecture	Enzymes	Enzymes	2 hours	24
Weekly and monthly exams	lecture	Vitamins	Vitamins	2 hours	25
Weekly and monthly exams	lecture	Vitamins	Vitamins	2 hours	26
Weekly and monthly exams	lecture	Hormones	Hormones	2 hours	27

Weekly	lecture	Hormones	Hormones	2 hours	28
and					
monthly					
exams					

11- Course development plan	
	Biochemistry/Dr. Talal Al-Najafi
1- Required prescribed books	Introduction to biochemistry / Dr.
	Khawla Al-Flih
	Biochemistry / Part One / Dr. Tariq
2- (Main references (sources)	
	Physiological biochemistry/Dr. Sami Al-
A- Recommended books and references	Muzaffar
( Scientific journals, bottles)	Younis Mahmoud - Dr. Louay
	Abdul Ali Al-Hilali / Ministry of Higher
	Education and Scientific Research /
	University
	Mosul
B- Electronic references, websites	Biochemistry/Lippincott
	Biochemistry/Harper

12- Course development plan .
Using blended learning to teach theoretical and practical subjects, using computers
and electronic applications to explain the subject to students, as well as conducting
electronic exams, including using the Google Classroom application.
Create a channel on You Tube and upload lectures to it so that they can be a
reference for students