

**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
2025-2026**

Introduction

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Academic Program Description Form

University Name: 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: 6/10/2025

File Completion Date: 6/10/2025

Signature:



Head of Department Name:

Prof.Dr. Mouayed Yousif Kadhum

Date:6/10/2025

Signature:



Scientific Associate Name:

Assis. Prof.Dr. Haider Qassem Fadhel

Date: 6/10/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department

Assis.Prof.Dr. Husain Ali Badran

Date: 6/10/2025

Signature:



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	14	8.14	basic
College Requirements	9	34	19.76	basic
Department Requirements	23	124	72..09	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	2	2
First year	-	Organic Chemistry	2	2
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	2

Second year	-	Analytical Chemistry	2	2
Second year	-	Organic Chemistry	2	2
Second year	-	Physical Chemistry	2	2
Second year	-	Mathematics	1	0
Second year	-	Computer2	1	0
Second year	-	Baath Regime Crimes in Iraq	1	0
Second year	-	Curriculums and School Books	1	2
Second year	-	Educational Leadership and Administration	2	0
Second year	-	English Language	1	0
Second year	-	Arabic Language	1	0
Second year	-	Teaching Thinking	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

٢-Conducting monthly exams for students

٣- 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	-	-	1	-
Assistant lecturer	Chemistry	Physical chemistry	-	-	1	1 Ministerial contract
Assistant lecturer	Chemistry	Biochemistry	-	-	2	-

Assistant Professor	Pedagogical guidance	Educational Leadership and Administration	-	-	-	1
Assistant Professor	Pedagogical guidance	Curriculums and School Books	-	-	-	2
Assistant lecturer	Pedagogical guidance	Developmental and Educational Psychology	-	-	-	2
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															
Year/Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes											
				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	•	•	•	•	•	•	•	•	•	•	•	•
		Computer1	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	•	•	•	•	•	•	•	•	•	•	•	•
		Computer2	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Crimes of the Defunct Baath Party	Basic	•		•	•	•	•	•	•	•	•	•	•
		Educational Leadership and Administration	Basic	•	•	•	•		•	•	•	•	•	•	•
		English language	Basic	•	•	•	•	•	•	•	•	•	•	•	•

Third stage		Curriculum and School Books	Basic	•	•	•	•	•	•	•	•	•	•	•	•
		Teaching Thinking	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.

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.Rafid Humedan				
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
	۳۵%	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				
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 Nhamkin)				
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
	۳۰%	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

Course Description of Computer					
Second stage					
Course Instructor	Prof.Dr. Faiza Abdulkareem Nasir				
E_mail					
Title	Organic chemistry				
Course Coordinator					
Course Objective	Familiarize the student with the types of organic compounds, their properties, and methods of				
Course Description	In eight chapters, we cover the preparation and reactions of organic substances (aryl halides, phenols,				
Textbook	Organic chemistry by Roberts .Stewart .Caserio				
References	Any textbook in organic chemistry				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	As (35%)	As (15%)	As (10%)	----	As (40%)
General Notes	Type here general notes regarding the course				

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Aryl halide	Preparation chloro benzene	Lecture	Weakly and monthly exam
2	Physical properties		Lecture	Weakly and monthly exam
3	Preparation of aryl halides		Lecture	Weakly and monthly exam
4	Reaction of aryl halides	Preparation of acetanlide	Lecture	Weakly and monthly exam
5	spectra of aryl halides		Lecture	Weakly and monthly exam

6	Phenols		Lecture	Weakly and monthly exam
7	Physical properties		Lecture	Weakly and monthly exam
8	Preparation of phenol	Preparation of p-bromo phenol	Lecture	Weakly and monthly exam
9	Reaction of phenol		Lecture	Weakly and monthly exam
10	spectra of phenol		Lecture	Weakly and monthly exam
11	Aldehydes and ketones	Tollens reagent	Lecture	Weakly and monthly exam
12	Preparation		Lecture	Weakly and monthly exam
13	Reaction		Lecture	Weakly and monthly exam
14	Carbonyl groups of Aldehydes and ketones		Lecture	Weakly and monthly exam
15	Nucleophilic sub.	Schiff base	Lecture	Weakly and monthly exam
16				
17	Carboxylic acids		Lecture	Weakly and monthly exam
18	Physical properties		Lecture	Weakly and monthly exam
19	Preparation of carboxylic acids		Lecture	Weakly and monthly exam
20	Reaction of carboxylic acids		Lecture	Weakly and monthly exam
21	spectra of carboxylic acids		Lecture	Weakly and monthly exam
23	Derivatives of carboxylic acids		Lecture	Weakly and monthly exam
24	Derivatives of carboxylic acids	Preparation of benzoic acid	Lecture	Weakly and monthly exam
25	Physical properties		Lecture	Weakly and monthly exam
26	Preparation of derivatives carboxylic acids	Preparation of ethyl benzoate	Lecture	Weakly and monthly exam
27	Reaction of derivatives carboxylic acids		Lecture	Weakly and monthly exam
28	spectra of derivatives carboxylic acids		Lecture	Weakly and monthly exam
29	Amines and dizonium salts	Preparation of dizonium salts	Lecture	Weakly and monthly exam
30	Preparation	And azo compound	Lecture	Weakly and monthly exam
31	Reaction		Lecture	Weakly and monthly exam

32	Organic compounds of phosphorus		Lecture	Weakly and monthly exam
33	Preparation		Lecture	Weakly and monthly exam
34	Reaction		Lecture	Weakly and monthly exam

Course Instructor	Dr.Adnan Sultan Abdulnabi				
E-mail					
Title	Analytical chemistry				
Course Coordinator					
Course Objective	Quantitative and qualitative procedures				
Course Description					
Textbook	Analytical chemistry by Tarik Abdul Kasem N.				
References	Analytical chemistry by Gary				
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	Analytical chemistry and its branches	Crystallization water in aqueous barium chloride	Lecture	Weakly and monthly exam
2	Quantitative and qualitative procedures	Saturation degree and solubility ionic product	Lecture	Weakly and monthly exam

3	Precipitates properties	Calcium determination in calcium oxalate form	Lecture	Weakly and monthly exam
4	Chemical structure of precipitates	Chloride determination in si	Lecture	Weakly and monthly exam
5	Quantitative and gravimetric calculations	Sulfate determination in barium sulfate form	Lecture	Weakly and monthly exam
6	Weight parameter-precipitates solubility	Lead determination in lead chromate form	Lecture	Weakly and monthly exam
7	Solubility and solubility product	Precipitation of lead as lead chromate	Lecture	Weakly and monthly exam
8	Iron determination as ferrichydroxide	Factors affected the precipitates solubility	Lecture	Weakly and monthly exam
9	Aluminum precipitation as hydroxide form and its determination as oxide form	Factors affected the precipitates solubility	Lecture	Weakly and monthly exam
10	Aluminum precipitation as oxide form by precipitation in homogeneous solution	Precipitates crystal formation	Lecture	Weakly and monthly exam
11	Nickel determination as dimethyl dioxime complex	Relative over saturation case	Lecture	Weakly and monthly exam
12	Iodine distribution between organic solvent and water	Precipitates contamination and their types	Lecture	Weakly and monthly exam
13	distribution between organic solvent and iodine aqueous solution	Chemical extraction methods	Lecture	Weakly and monthly exam
14	Capacity calculation of cationic resin	Solvent extraction	Lecture	Weakly and monthly exam
15	Total cations determination in water	Extraction systems	Lecture	Weakly and monthly exam

Course Instructor	Prof.Dr.Auhod Jabbar				
E-mail					
Title	Physical Chemistry				
Course Coordinator	Thermodynamic				
Course Objective	Explain the bases of thermodynamic to the student through full study for all gases and liquids cases and study every relations of thermodynamic functions and refer to it applications and study the physical and chemical changes.				
Course Description	Study the thermodynamic law's (1st, 2nd and 3rd) and all its functions represented by (enthalpy, entropy, free energy and inter energy) and another law's like (Hess's, Kerchief's, Clausius-Clayron).				
Textbook	1. Physical Chemistry (questions and answers), Dr. Anis Al.Najar. 2. Physical Chemistry, Dr. Layla.				
References	1. Physical Chemistry, Dr. Sharma. 2. Physical Chemistry, Dr. J.Moore. 3. Internet.				
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	Subjects	Explain of experiments 1st	Lecture	Weakly and monthly exam

2	Gases (laws and properties)	Explain of experiments 1st	Lecture	Weakly and monthly exam
3	General gases equation, Avogadro law's	Liquids density	Lecture	Weakly and monthly exam
4	Dalton law's, Kinetic gases theory	Correct mistakes of first experiment.	Lecture	Weakly and monthly exam
5	Gas pressure, Vander Val equation	Repeat of first experiment.	Lecture	Weakly and monthly exam
6	Thermodynamic (properties, systems)	Liquids density as function to temperature	Lecture	Weakly and monthly exam
7	Types of energy, Work status	Liquids viscosity	Lecture	Weakly and monthly exam
8	Thermodynamic processes, Work equation	Liquids viscosity as function to temperature	Lecture	Weakly and monthly exam
9	Thermodynamic functional, First law	Discuss the practical reports	Lecture	Weakly and monthly exam
10	Enthalpy, Heat of capacity	Find the enthalpy from solubility	Lecture	Weakly and monthly exam
11	Joule expert., relation between C_p , C_v	Find the neutralization of heat	Lecture	Weakly and monthly exam
12	Adipatic reversible and irreversible processes	Calculate the calorimetric constant	Lecture	Weakly and monthly exam
13	Thermo Chemistry and reactions	Discuss the practical reports	Lecture	Weakly and monthly exam
14	Types of enthalpy, Hess's law	-	Lecture	Weakly and monthly exam
15	Kirchoff's equation, Enthalpy with temp.	Examination	Lecture	Weakly and monthly exam
16	Second law of thermodynamic	-	Lecture	Weakly and monthly exam
17	Mechanical efficiency, Carnot cycle	Explain of experiments 2nd	Lecture	Weakly and monthly exam
18	Entropy to reversible and irreversible processes	Explain of experiments 2nd	Lecture	Weakly and monthly exam
19	Cycle processes and Third law	The relation between adsorption and concentration	Lecture	Weakly and monthly exam

20	Free energy, criterion of equilibrium	Correct mistakes of first experiment.	Lecture	Weakly and monthly exam
21	Clausius-Clapyron equation, Chemistry equilibrium.	Repeat of first experiment.	Lecture	Weakly and monthly exam
22	Equilibrium constant, criterion of le-chatelier	Change surface tension as function to temperature	Lecture	Weakly and monthly exam
23	Law of mass action, relation between Kp, Kv	Find molecular radius from viscosity measurements	Lecture	Weakly and monthly exam
24	Chemical potential	Discuss the practical reports	Lecture	Weakly and monthly exam
25	Essential equation of thermodynamic	Find molecular weight to polymer from viscosity measurements	Lecture	Weakly and monthly exam
26	Maxwell relations, Types of adsorption	Find the neutralization of heat to acid-base	Lecture	Weakly and monthly exam
27	Curve and equation of Longmire to adsorption	Find the enthalpy of solution	Lecture	Weakly and monthly exam
28	Thermodynamic of solutions	Discuss the practical reports	Lecture	Weakly and monthly exam
29	The properties of ideal solution, Raoult's law	-	Lecture	Weakly and monthly exam
30	Colligative properties of ideal solution	Examination	Lecture	Weakly and monthly exam
31	Static thermodynamic	-	Lecture	Weakly and monthly exam
32	The distribution of Boltzman's law	Final Examination	Lecture	Weakly and monthly exam

Course Instructor	Dr.Hanadi Mahdi Jarallah
E-mail	
Title	Inorganic Chemistry
Course Coordinator	Chemistry of representative elements

Course Objective					
Course Description	Study the chemistry of main group from I-VIII B				
Textbook	Inorganic Chemistry, Cotton.				
References	Advanced Inorganic Chemistry, J. Huhey				
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	Periodic table	Safety of Lab.	Lecture	Weakly and monthly exam
2	Main group & transition metals	Hydrogen chemistry	Lecture	Weakly and monthly exam
3	Chemistry of hydrogen	Preparation of LiCl	Lecture	Weakly and monthly exam
4	Hydrogen compounds	Preparation of NaCl	Lecture	Weakly and monthly exam
5	Hydrogen bond	Preparation of Na ₂ SO ₄	Lecture	Weakly and monthly exam
6	Chemistry of alkali metals	Preparation of K ₂ SO ₄	Lecture	Weakly and monthly exam
7	Compounds and	Preparation of BeSO ₄	Lecture	Weakly and monthly exam
8	their solution in NH ₃	Preparation of BeCrO ₄	Lecture	Weakly and monthly exam
9	Isotopes and	Preparation of pyrophospho-	Lecture	Weakly and monthly exam
10	its applications	Preparation of B ₂ O ₃	Lecture	Weakly and monthly exam
11	Chemistry of group II B	Preparation of BaB ₂ O ₃	Lecture	Weakly and monthly exam
12	Chemical and physical	Preparation of Al ₂ O ₃	Lecture	Weakly and monthly exam
13	Properties and preparation	Preparation of Al(PO ₄)	Lecture	Weakly and monthly exam
14	Chemistry of Boron group	Preparation of CaCO ₃	Lecture	Weakly and monthly exam
15	Chemistry of Aluminum	Preparation of SnCl ₂	Lecture	Weakly and monthly exam

16	Their compounds		Lecture	Weakly and monthly exam
17	The chemistry of carbon	Preparation of PbCr_2O_4	Lecture	Weakly and monthly exam
18	and its compounds	Preparation of As_2O_3	Lecture	Weakly and monthly exam
19	and other elements	Preparation of BaSO_4	Lecture	Weakly and monthly exam
20	The chemistry of V group	Preparation of $\text{MoPO}_4(\text{NH}_3)$	Lecture	Weakly and monthly exam
21	Chemistry of nitrogen	Preparation of BiOI	Lecture	Weakly and monthly exam
22	Nitrogen compound	Preparation of MnO_2	Lecture	Weakly and monthly exam
23	Chemistry of phosphor	Preparation of MnSO_4	Lecture	Weakly and monthly exam
24	Application of group	Preparation of BaSO_4	Lecture	Weakly and monthly exam
25	Chemistry of oxygen	Preparation of BaS_2O_3	Lecture	Weakly and monthly exam
26	Oxygen and its compounds	Preparation of Ag_2SO_4	Lecture	Weakly and monthly exam
27	Sulphur chemistry	Preparation of AgCl	Lecture	Weakly and monthly exam
28	Other elements of group	Preparation of MnCl_2	Lecture	Weakly and monthly exam
29	Halogens	Preparation of AgI	Lecture	Weakly and monthly exam
30	and its compounds	Preparation of PbCl_2	Lecture	Weakly and monthly exam
31	Nobel gases	Preparation of AgBr	Lecture	Weakly and monthly exam
32	and its compounds		Lecture	Weakly and monthly exam

Course Description of Computer	
Third stage	
Course Instructor	Dr.Ali Abdulwahid Abdulhusain
E-mail	
Title	Biochemistry
Course Coordinator	

Course Objective	Study of the chemical nature of the cells and the chemical reaction which produce in it.				
Course Description	Concept of the Biochemistry, cells, study of Biomolecule in the cell including carbohydrates, proteins and amino acid, lipid, enzymes, nucleic acids(RNA,DNA), vitamins, hormones.				
Textbook	Biochemistry , Kais A. Al-Gailany, I.A. Al-Hassan.				
References	1- Biochemistry, Talal S. Al-Najafi. 2- Biochemistry, Basil Dalay. 3- Biochemistry, Kawla A. Al-Flayah..				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	50%	-	-	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Concept of Biochemistry, cell		Lecture	Weakly and monthly exam
2	Biomolecules, water		Lecture	Weakly and monthly exam
3	Carbohydrates, classification		Lecture	Weakly and monthly exam
4	Reaction, necessary, oligo		Lecture	Weakly and monthly exam
5	Sugars, classification		Lecture	Weakly and monthly exam
6	Structures, polysaccharides		Lecture	Weakly and monthly exam
7	Structures, reactions		Lecture	Weakly and monthly exam
8	Necessary, lipid, structures		Lecture	Weakly and monthly exam
9	Fatty acids, names, types		Lecture	Weakly and monthly exam
10	Reactions, sphingolipids,		Lecture	Weakly and monthly exam
11	Saccharolipids, terpenes, steroids		Lecture	Weakly and monthly exam
12	Amino acids, types, reactions		Lecture	Weakly and monthly exam
13	Necessary, peptides, types		Lecture	Weakly and monthly exam

14	Formation, hydrolysis, separation		Lecture	Weakly and monthly exam
15	Sequences, precipitation, necessary		Lecture	Weakly and monthly exam
16	Structures, precipitation, necessary		Lecture	Weakly and monthly exam
17	Enzymes, natures, activation		Lecture	Weakly and monthly exam
18	Energy, activities, theories		Lecture	Weakly and monthly exam
19	Nomelecure, types, factors		Lecture	Weakly and monthly exam
20	Affected the activity		Lecture	Weakly and monthly exam
21	Inhibitors, mechanism of reaction		Lecture	Weakly and monthly exam
22	Allosteric enzyme		Lecture	Weakly and monthly exam
23	Isoenzyme, uses, Nucleic acids		Lecture	Weakly and monthly exam
24	Types, nucleotides		Lecture	Weakly and monthly exam
25	Structures, types of RNA		Lecture	Weakly and monthly exam
26	Structure, necessary, DNA		Lecture	Weakly and monthly exam
27	Structure, theories of formation		Lecture	Weakly and monthly exam
28	Properties, mutation		Lecture	Weakly and monthly exam
29	Vitamins, types, soluble in water		Lecture	Weakly and monthly exam
30	And lipids, structures		Lecture	Weakly and monthly exam
31	Properties, coenzyme		Lecture	Weakly and monthly exam
32	Hormones, types, mechanism of reaction		Lecture	Weakly and monthly exam

Course Instructor	Dr. Dhia Abdulmuhsin Hasan
E-mail	
Title	Industrial Chemistry
Course Coordinator	

Course Objective	To know the important of industrial chemistry and learning about some industries.				
Course Description	The course need 60houres for theoretical industrial chemistry with 3houres weekly practical.				
Textbook	1-Industrial Chemistry for 3rd year student, Jawad Khadim, (1989). 2-Industrial Chemistry, N.M.A. Wadi/A. Ajam, (1989).				
References	4- Industrial organic chemistry, G.Adam, (1980). 5- Entering to Industrial Chemistry, S. Noman. 6- Chemical Process Industries, R.N. Shreve.				
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/Industrial Chemistry	Safety in Lab.	Lecture	Weakly and monthly exam
2	Chemical process economics	Exp. on water	Lecture	Weakly and monthly exam
3	Chemical process		Lecture	Weakly and monthly exam
4	Operations	Preparation of polymer	Lecture	Weakly and monthly exam
5	Corrosion		Lecture	Weakly and monthly exam
6	Types/theories/treatments	Cellulose acetate preparation	Lecture	Weakly and monthly exam
7	Water treatment		Lecture	Weakly and monthly exam
8	Source/quality/treatment	Phenol-formaldehyde preparation	Lecture	Weakly and monthly exam
9	Pollution/industrial		Lecture	Weakly and monthly exam
10	Water pollution	Preparation and detecting of polymers	Lecture	Weakly and monthly exam
11	Air pollution		Lecture	Weakly and monthly exam

12	Soil and other pollutions	Preparation of soap	Lecture	Weakly and monthly exam
13	Soap industry		Lecture	Weakly and monthly exam
14	Raw material	Experiment in soap	Lecture	Weakly and monthly exam
15	Manufacture/detergents		Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Fragrances industry	Extraction of Oil	Lecture	Weakly and monthly exam
18	Source/extraction		Lecture	Weakly and monthly exam
19	Dye/industry	Preparation of Dye	Lecture	Weakly and monthly exam
20	Classification/manufacture		Lecture	Weakly and monthly exam
21	Insecticides industry	Preparation of Dye	Lecture	Weakly and monthly exam
22	Type/raw material/manufacture		Lecture	Weakly and monthly exam
23	Fertilizer	Dying	Lecture	Weakly and monthly exam
24	Types/manufacture		Lecture	Weakly and monthly exam
25	Glass industry	Preparation of Fertilizer	Lecture	Weakly and monthly exam
26	Raw material/manufacture		Lecture	Weakly and monthly exam
27	Cements	Analytical of fertilizer	Lecture	Weakly and monthly exam
28	Raw material/manufacture		Lecture	Weakly and monthly exam
29	Sulphur / sulphuric acid	Isotropic distillation	Lecture	Weakly and monthly exam
30	Sulphur		Lecture	Weakly and monthly exam
31	Food industries	Adhesive Preparation	Lecture	Weakly and monthly exam
32	Sugar/milk processing/fermentation		Lecture	Weakly and monthly exam

Course Instructor	Dr.Rehab Gani Abud
E-mail	
Title	Organic Chemistry
Course	

Course Objective	Study of mechanism for different organic reactions and general study of polycyclic and heterocyclic compounds				
Course Description	Organic chemistry includes the principles of stereochemistry and most of organic reactions mechanism and all the intermediate and also includes heterocyclic compounds and polycyclic compounds.				
Textbook	1-Guide to organic reaction mechanism, translator Fahdil Kammona. 2-Introduction in organic chemistry, translator Fahdil Kammona.				
References	Organic chemistry, Mohammad Nazar.				
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	Stereochemistry/chiral carbon/symmetry rules	Qnnizaro reaction	Lecture	Weakly and monthly exam
2	Kinds of isomers		Lecture	Weakly and monthly exam
3	Enantiomers/diastere isomers/epimer & meso form	Aldol reaction	Lecture	Weakly and monthly exam
4	Pseudo chiral carbon atom/separation of enantiomers		Lecture	Weakly and monthly exam
5	Some of special reactions	Diels-alder reaction	Lecture	Weakly and monthly exam
6	Acids and their types		Lecture	Weakly and monthly exam
7	Bases and their types	Benzoin reaction	Lecture	Weakly and monthly exam

8	Nucleophilic substitution reactions/introduction		Lecture	Weakly and monthly exam
9	Racemic reactions S_N^1	Benzil reaction	Lecture	Weakly and monthly exam
10	Inversion reactions S_N^2		Lecture	Weakly and monthly exam
11	Retention reaction with many types	Benzilic acid reaction	Lecture	Weakly and monthly exam
12	Special reactions		Lecture	Weakly and monthly exam
13	Effect of nucleophile solvents & structures	Crossed aldol reaction	Lecture	Weakly and monthly exam
14	Elimination reactions E1 , E2 , E1CB		Lecture	Weakly and monthly exam
15	Syn elimination		Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Carboniums methods of formation		Lecture	Weakly and monthly exam
18	Stability and stereochemistry	Succinic anhydride reaction	Lecture	Weakly and monthly exam
19	Migration to carbon deficient centre		Lecture	Weakly and monthly exam
20	Migration to nitrogen & oxygen deficient centre	Isolation of caeffeine from tea	Lecture	Weakly and monthly exam
21	Carbanions/methods and formation		Lecture	Weakly and monthly exam
22	Stability and stereochemistry	Isolation of licopein from to tomato	Lecture	Weakly and monthly exam
23	Migration and named reactions		Lecture	Weakly and monthly exam
24	Free radical reaction	Isolation of natural products by using continuous extraction	Lecture	Weakly and monthly exam
25	Formation, and ending, stereochemistry & the identification & free radical		Lecture	Weakly and monthly exam
26	Poly nuclear fused aromatic systems introduction	Methods of identification of or hetero compounds	Lecture	Weakly and monthly exam
27	Structure and specification		Lecture	Weakly and monthly exam
28	Preparation and reaction		Lecture	Weakly and monthly exam
29	Heterocyclic compounds/introduction	Analysis and identification	Lecture	Weakly and monthly exam
30	Five, six and fused systems		Lecture	Weakly and monthly exam

31	Preparation and identification	of some mixed organic compounds	Lecture	Weakly and monthly exam
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Course Instructor	Dr.Jasim Muhamed Salih				
E-mail					
Title	Inorganic Chemistry				
Course Coordinator					
Course Objective	coordination chemistry				
Course Description					
Textbook	Inorganic chemistry coordination chemistry				
References	Inorganic chemistry coordination chemistry by Ehssan A.				
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 in coordination chemistry	Preparation of potassium dioxalato copper(II).2H ₂ O	Lecture	Weakly and monthly exam

2	Chain Theory	Sodium tricarbonato cobaltate(III).3H ₂ O preparation	Lecture	Weakly and monthly exam
3	Werner's Theory		Lecture	Weakly and monthly exam
4	Types of Ligands	Carbonato pentaamine cobalt(III)nitrate preparation	Lecture	Weakly and monthly exam
5	Naming of coordination's complexes	Nitropenta amine cobalt(III) nitrate preparation	Lecture	Weakly and monthly exam
6	Theories of coordination's compounds		Lecture	Weakly and monthly exam
7	Valence bond theory (V.B.T.)	Nitropenta amine cobalt(III) chloride preparation	Lecture	Weakly and monthly exam
8	Crystal Field Theory (C.F.T.)	Trinitro triamine cobalt(III) chloride preparation	Lecture	Weakly and monthly exam
9	Crystal Field Stabilization		Lecture	Weakly and monthly exam
10	Pairing Energy	Hexa amine cobalt(III) chloride preparation	Lecture	Weakly and monthly exam
11	Orbitals symmetry	Tetra amine copper(II) sulfate preparation	Lecture	Weakly and monthly exam
12	Molecular orbital theory		Lecture	Weakly and monthly exam
13	Energy diagrams for complexes	Hexa (thiourea)zinc(II) sulfate preparation	Lecture	Weakly and monthly exam
14	Type of coordination's compounds preparations	Tri (ethylene diamine) nickel(II)chloride.2H ₂ O preparation	Lecture	Weakly and monthly exam
15	Reactions in aqueous and non aqueous solvents		Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Reactions without solvents		Lecture	Weakly and monthly exam
18	Oxidations- reductions reactions		Lecture	Weakly and monthly exam
19	Reactions with catalysis		Lecture	Weakly and monthly exam
20	Stability of coordination's compounds		Lecture	Weakly and monthly exam

21	Coordination numbers		Lecture	Weakly and monthly exam
22	Isomerism in coordination compounds		Lecture	Weakly and monthly exam
23	Geometrical and optical isomerism		Lecture	Weakly and monthly exam
24	Ionization isomerism		Lecture	Weakly and monthly exam
25	Kinetic and mechanism of complexes		Lecture	Weakly and monthly exam
26	Oxidations and reductions mechanism reactions		Lecture	Weakly and monthly exam
27	Transition elements		Lecture	Weakly and monthly exam
28	Electronic configuration		Lecture	Weakly and monthly exam
29	Chemical properties		Lecture	Weakly and monthly exam
30	Chemical properties		Lecture	Weakly and monthly exam
31	Important compounds for coordinate		Lecture	Weakly and monthly exam

Course Instructor	Dr.Adil Maalla Dhemed				
E-mail					
Title	Physical Chemistry				
Course Coordinator					
Course Objective	Classification of chem. Reactions speed and nature of reaction				
Course Description					
Textbook	Physical chemistry by Barow Wilkinson				
References	Physical chemistry by w.j.moor				
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	Classification of chem. Reactions speed and nature of reaction	Determination order and velocity constant to methyacetate	Lecture	Weakly and monthly exam
2	Homogenous and hetrogenous and catalyzed	Determination of dissociation const of H_2O_2	Lecture	Weakly and monthly exam
3	Velocity constant, speed law , molecularity and order of reaction	Effect of salt on velocity constant	Lecture	Weakly and monthly exam
4	1 st order reaction , derivation law of velocity constant	Determination of velocity constant by sopination and conductance	Lecture	Weakly and monthly exam
5	Half life time and other fractional time	Effect of temperature on reaction velocity	Lecture	Weakly and monthly exam
6	Prove of order of reaction and it methods	Determination of dissociation constant of benzodiazonium chloride	Lecture	Weakly and monthly exam
7	Second and third order reaction and it $t_{1/2}$	Determination of H_2O_2 dissociation in volt metric method	Lecture	Weakly and monthly exam
8	Special and general case and derivation of velocity const. law	Determination order of I^- in KMnO_4 in acidic aced	Lecture	Weakly and monthly exam
9	Zero order and Pseudo molecular reaction and it derivation of K	Determination of suger analysis	Lecture	Weakly and monthly exam
10	Reaction of velocity const. with T. temperature and Arrhenius	Determination of E_a and K for Cr in EDTA	Lecture	Weakly and monthly exam
11	Complex reactions , reversible and chain reaction and it derivation	Determination of order and K for aceton and I^-	Lecture	Weakly and monthly exam
12	Consecutive and Parallel reaction K and derivation	Determination of K and order of bromination	Lecture	Weakly and monthly exam
13	Free radical reaction and molecularity reaction		Lecture	Weakly and monthly exam
14	Kinetic theory , collision theory and it weakness		Lecture	Weakly and monthly exam

15	Activated complex and unimolecular theory (Lindman)		Lecture	Weakly and monthly exam
			Lecture	Weakly and monthly exam
16	Bronsted and Polar reaction, salt effect, and ionic		Lecture	Weakly and monthly exam
18	Introduction to Electrochemistry	Determination of dissociation constant of weak electrolyte CH_3COOH by conductance	Lecture	Weakly and monthly exam
19	Conductivity and electrolyte	Applied Nerst equation on reaction of Fe and KMnO_4	Lecture	Weakly and monthly exam
20	Molar conductivity and specific conductance	Effect of ionic on shape of titration curve	Lecture	Weakly and monthly exam
21	Ionic conductance and concentration reaction	Determination of phosphoric and diss. Const. by pH measurement	Lecture	Weakly and monthly exam
22	Classification of electrocell and electrodes	Analysis voltage	Lecture	Weakly and monthly exam
23	electrocell and electrolyte	Determination of thermodynamic const. for Daniel cell	Lecture	Weakly and monthly exam
24	Potential and cell potential measur	Determination of pH by Queen hydrogen electrode	Lecture	Weakly and monthly exam
25	Cells- and liquid-liquid function potential	Determination of solubility for AgCl by conductance	Lecture	Weakly and monthly exam
26	Oxidation and reduction on electrode and cell reaction	Determination of molecular weight for polymer by viscosity	Lecture	Weakly and monthly exam
27	Ions in solution and electrolyte mobility and diffusion	Determination of E_a	Lecture	Weakly and monthly exam
28	Oxidation and electrode reaction and electrode current	Titration NaOH and HCl using hydrogen electrode	Lecture	Weakly and monthly exam
29	Cell thermodynamic	Titration of CH_3COOH vs NaOH by conductance	Lecture	Weakly and monthly exam
30	Hydrogen electrode and cell polarity	Determination of activity coefficient for ionic HCl	Lecture	Weakly and monthly exam
31	Problem and solution on cell	Study of I- to hexanon cyclic	Lecture	Weakly and monthly exam

32	Effect of solvent and polarity of electrode , salt effect		Lecture	Weakly and monthly exam
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Course Instructor	Dr.Maitham Najem				
E-mail					
Title	Research Approach				
Course Coordinator					
Course Objective	Application and leading how to write the science research				
Course Description	Fundamental for writing research science				
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	science research		Lecture	Weakly and monthly exam
2	How to write science research		Lecture	Weakly and monthly exam
3	Fundamental for writing research science		Lecture	Weakly and monthly exam
4	Title		Lecture	Weakly and monthly exam
5	Summary		Lecture	Weakly and monthly exam

6	Results		Lecture	Weakly and monthly exam
7	Discussion		Lecture	Weakly and monthly exam
8	Conclusion		Lecture	Weakly and monthly exam
9	Acknowledgement		Lecture	Weakly and monthly exam
10	List of references		Lecture	Weakly and monthly exam
11	Tables		Lecture	Weakly and monthly exam
12	Curves		Lecture	Weakly and monthly exam
13	Introduction		Lecture	Weakly and monthly exam
14	Discussion		Lecture	Weakly and monthly exam
15	Discussion		Lecture	Weakly and monthly exam
16			Lecture	Weakly and monthly exam
17	Acknowledgement of research		Lecture	Weakly and monthly exam
18	Kinds of research		Lecture	Weakly and monthly exam
19	Library		Lecture	Weakly and monthly exam
20	Report, thesis		Lecture	Weakly and monthly exam
21	Discussion		Lecture	Weakly and monthly exam
22	Roles of Results		Lecture	Weakly and monthly exam
23	Writing a summary		Lecture	Weakly and monthly exam
24	Research by going to lab.		Lecture	Weakly and monthly exam
25	The study how		Lecture	Weakly and monthly exam
26	Write and know the uses		Lecture	Weakly and monthly exam
27	Application		Lecture	Weakly and monthly exam
28	Writing results		Lecture	Weakly and monthly exam

Course Instructor	Dr. Kamil Hussein Alwan Dr.zainab Taha Yassin
E-mail	dr.alsodanifia@yahoo.com
Title	Instrumental Chemistry Analysis

Course Coordinator					
Course Objective	At the end of this course the students should be understanding the principles of chemical instrumental analysis and operating different instruments.				
Course					
Textbook	Instrumental Chemical Analysis, A.H. Al-Haydary, Baghdad univ. , (1998).				
References	1-Principle of Instrumental Analysis, 5th ed. , Skoog et al, Phladephia, (1998). 2-Fundamentals of Anal. Chem. , 8th ed. , Skoog et al, (2004).				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	50%	-	-	-	50%
General Notes	There are many specific topics add to the syllabus up to 20% such as FT, diode-array detector, automation in Analytical Chemistry.				

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Chapter one: Analytical Chemistry		Lecture	Weakly and monthly exam
2	And the concept of Instrumental Analysis	1-Det. Of Fe⁺³ by SCN⁻.	Lecture	Weakly and monthly exam
3		2-Det. Of Na by flame photometry.	Lecture	Weakly and monthly exam
4	Electromagnetic radiation		Lecture	Weakly and monthly exam
5	Interaction and its effect on matter	3-Det. Of K by flame photometry.	Lecture	Weakly and monthly exam
6	Quantitative analysis and		Lecture	Weakly and monthly exam
7	absorption electromagnetic	4-Det. Of Aspirin by	Lecture	Weakly and monthly exam

8	radiation	Conductometry titration.	Lecture	Weakly and monthly exam
9	The spectroscopy instrumental and their components	5-Beer's Law application	Lecture	Weakly and monthly exam
10		det. Of $\text{Co}(\text{NO}_3)_3$.	Lecture	Weakly and monthly exam
11	Application of absorption	6-Measurments of refractive Index.	Lecture	Weakly and monthly exam
12	Measurement of mechanism of UV-Visible		Lecture	Weakly and monthly exam
13	Analysis by measurement of Nephelometric and Turbidimetric	7-Polorometric : det. Of sugar conc.	Lecture	Weakly and monthly exam
14			Lecture	Weakly and monthly exam
15		8-Det. of mixture of KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ by absorption.	Lecture	Weakly and monthly exam
16	End term 1 exam		Lecture	Weakly and monthly exam
17			Lecture	Weakly and monthly exam
18			Lecture	Weakly and monthly exam
19			Lecture	Weakly and monthly exam
20			Lecture	Weakly and monthly exam
21			Lecture	Weakly and monthly exam
22			Lecture	Weakly and monthly exam
23	Mechanism of IR		Lecture	Weakly and monthly exam
24			Lecture	Weakly and monthly exam
25	Atomic Abs. spectroscopy and their properties		Lecture	Weakly and monthly exam
26			Lecture	Weakly and monthly exam
27			Lecture	Weakly and monthly exam
28	Analysis by electro-spectrophotometric analytical		Lecture	Weakly and monthly exam
29			Lecture	Weakly and monthly exam
30	Polarography		Lecture	Weakly and monthly exam
31	End term 2 exam		Lecture	Weakly and monthly exam
32			Lecture	Weakly and monthly exam

Course Instructor	Dr.Dawood Salim Abid				
E-mail					
Title	Spectroscopic identification				
Course Coordinator	Identification of organic compounds				
Course Objective	Study the principle of spectroscopic methods in identification.				
Course Description	Infra-Red, H-NMR, C13-NMR and mass spectra.				
Textbook	Spectroscopic identification of organic compounds, Silverstain				
References	Introduction in spectroscopy, pavia.				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	28%	15%	7%	-	35%
General Notes	The final Practical exam 15%				

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	spectroscopy		Lecture	Weakly and monthly exam
2	IR spectroscopy, preparation of samples for IR		Lecture	Weakly and monthly exam
3	Stretching & bending for C-H, NH, OH		Lecture	Weakly and monthly exam
4	Double and triple bonds region		Lecture	Weakly and monthly exam
5	Examples		Lecture	Weakly and monthly exam
6	Introduction HNMR, magnetic nuclei		Lecture	Weakly and monthly exam

7	Chemical shift, factor affecting		Lecture	Weakly and monthly exam
8	Multiplicity and shape of signal		Lecture	Weakly and monthly exam
9	Solvents, references		Lecture	Weakly and monthly exam
10	OH, NH, SH		Lecture	Weakly and monthly exam
11	Examples		Lecture	Weakly and monthly exam
12	Examples		Lecture	Weakly and monthly exam
13	Problems for IR + HNMR		Lecture	Weakly and monthly exam
14	¹³ CNMR		Lecture	Weakly and monthly exam
15	Chemical shift for C-13		Lecture	Weakly and monthly exam
16	Examples		Lecture	Weakly and monthly exam
17			Lecture	Weakly and monthly exam
18			Lecture	Weakly and monthly exam
19			Lecture	Weakly and monthly exam
20			Lecture	Weakly and monthly exam
21			Lecture	Weakly and monthly exam
22			Lecture	Weakly and monthly exam
23	Mass spectroscopy		Lecture	Weakly and monthly exam
24	Method of ionization E1		Lecture	Weakly and monthly exam
25	Molecular ion and base peak		Lecture	Weakly and monthly exam
26	Method of fragmentation		Lecture	Weakly and monthly exam
27	Method of fragmentation		Lecture	Weakly and monthly exam
28	Examples		Lecture	Weakly and monthly exam
29	Problems including IR+HNMR+ ¹³ CNMR+Mass		Lecture	Weakly and monthly exam
30	Problems including IR+HNMR+ ¹³ CNMR+Mass		Lecture	Weakly and monthly exam
31	Problems including IR+HNMR+ ¹³ CNMR+Mass		Lecture	Weakly and monthly exam
32	Problems including IR+HNMR+ ¹³ CNMR+Mass		Lecture	Weakly and monthly exam

Course Instructor	Dr.Mahmood Shakir Hasen				
E-mail					
Title	Industrial Chemistry				
Course Coordinator					
Course Objective	Introduction for polymer and petrol chemistry.				
Course Description	Polymer and technology of polymer and petrol chemistry.				
Textbook	Principle of polymer				
References	1-polymer chemistry. 2-Industrial chemistry.				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	50%	-	-	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Introduction-classification		Lecture	Weakly and monthly exam
2	Nomenclature-synthesis		Lecture	Weakly and monthly exam
3	Reaction-condensation		Lecture	Weakly and monthly exam
4	Addition polymerization		Lecture	Weakly and monthly exam

5	Ionic polymerization		Lecture	Weakly and monthly exam
6	Copolymerization		Lecture	Weakly and monthly exam
7	Molecular weight		Lecture	Weakly and monthly exam
8	Organic polymer		Lecture	Weakly and monthly exam
9	Plastics		Lecture	Weakly and monthly exam
10	Application		Lecture	Weakly and monthly exam
11	Rubber-types		Lecture	Weakly and monthly exam
12	Vulcanization		Lecture	Weakly and monthly exam
13	Fiber		Lecture	Weakly and monthly exam
14	Cellulose		Lecture	Weakly and monthly exam
15	Rayon		Lecture	Weakly and monthly exam
16	Synthesis of fibers		Lecture	Weakly and monthly exam
			Lecture	Weakly and monthly exam
17	Adhesives		Lecture	Weakly and monthly exam
18	Petrol technology		Lecture	Weakly and monthly exam
19	Treatment		Lecture	Weakly and monthly exam
20	Sources		Lecture	Weakly and monthly exam
21	Distillation		Lecture	Weakly and monthly exam
22	Octane number		Lecture	Weakly and monthly exam
23	Thermal cracking		Lecture	Weakly and monthly exam
24	Catalytic cracking		Lecture	Weakly and monthly exam
25	Ethylene product		Lecture	Weakly and monthly exam
26	Aromatic industry		Lecture	Weakly and monthly exam
27	Benzene-toluene		Lecture	Weakly and monthly exam
28	Nitration		Lecture	Weakly and monthly exam
29	Oxidation		Lecture	Weakly and monthly exam
30	Halogenation		Lecture	Weakly and monthly exam
31	PVC		Lecture	Weakly and monthly exam
32	Chlorine		Lecture	Weakly and monthly exam

Course Instructor	Dr. Bahjat Ali Saeed Dr. Adel Emala Dhemad				
E-mail	Bahjat.saeed@yahoo.com				
Title	Physical Chemistry				
Course Coordinator	Quantum Chemistry and Physical Spectroscopy				
Course Objective	To introduce 4th class student to some aspects of quantum mechanics, spectroscopy and the electronic structure of atoms and molecules.				
Course Description	Some basic aspects, foundations of classical mechanics, reasons of quantum mechanics, quantum mechanics, approximation methods, molecular spectroscopy.				
Textbook	Quantum chemistry and molecular spectroscopy, Q. Abdul Kareem.				
References	1-Quantum mechanics in chemistry, M.W. Hanna. 2-Fundamental of Molecular Spectroscopy, C.N. Banwell.				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	40%	-	10%	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Coord. Systems, comp. number		Lecture	Weakly and monthly exam
2	Operators, eigen value eq., conservation system.		Lecture	Weakly and monthly exam
3	Nuton low, Lagrangian and Hamiltonian equations.		Lecture	Weakly and monthly exam
4	Black body radiation		Lecture	Weakly and monthly exam
5	Photoelectric effect, atomic spectra		Lecture	Weakly and monthly exam
6	Schrodinger equation		Lecture	Weakly and monthly exam
7	The postulates of Quantum Mechanics		Lecture	Weakly and monthly exam
8	The postulates of Quantum Mechanics		Lecture	Weakly and monthly exam
9	Hermitian operator, normalization, orthogonality		Lecture	Weakly and monthly exam
10	Particle in a box		Lecture	Weakly and monthly exam
11	Particle in a box		Lecture	Weakly and monthly exam
12	Harmonic Oscillator		Lecture	Weakly and monthly exam
13	Solid rotator		Lecture	Weakly and monthly exam
14	Hydrogen atom		Lecture	Weakly and monthly exam
15	Hydrogen atom		Lecture	Weakly and monthly exam
16	Approximation methods		Lecture	Weakly and monthly exam
			Lecture	Weakly and monthly exam
17	Microwave spectroscopy		Lecture	Weakly and monthly exam
18	Infrared spectroscopy		Lecture	Weakly and monthly exam
19	Infrared spectroscopy		Lecture	Weakly and monthly exam
20	Raman spectroscopy, electronic spectroscopy		Lecture	Weakly and monthly exam
21	NMR spectroscopy		Lecture	Weakly and monthly exam

Course Instructor	Dr.Abbas Dewas Mutar				
E_mail					
Title	Biochemistry				
Course Coordinator	Metabolism of Bio compounds				
Course Objective	To explain the metabolism of some bio compounds (catabolism and anabolism). These compound include Carbohydrates, Lipids, Proteins and Amino acids . Study of genetic information				
Course Description					
Textbook	1-Introduction of biochemistry, Dr. khaula. A. Al-Flaieh. 2-Principles of biochemistry, Dr. Basil K. Dalaly.				
References	Lippincott's Illustrated reviews Biochemistry by Pamela C.Champe , Richard A. Harvey and Denise R. Ferrier				
Course Assessment	Term Tests	Laboratory	Quizzes	Project	Final Exam
	30%	15%	5%	-	50%
General Notes					

week	Topics Covered	Lab. Experiment Assignments	Learning method	Evaluation method
1	Energy transfer and conversion,		Lecture	Weakly and monthly exam
2	role of ATP,ADP in phosphate energy		Lecture	Weakly and monthly exam
3	transfer, oxidation-reduction reaction		Lecture	Weakly and monthly exam
4	Definition of metabolism,digestion and		Lecture	Weakly and monthly exam
5	absorption of carbohydrates,glycolysis		Lecture	Weakly and monthly exam
6	Krebs and Glyoxylic cycle		Lecture	Weakly and monthly exam

7	Pentose pathway ,glycogenolysis		Lecture	Weakly and monthly exam
8	Gluconeogenesis,Glycogenesis		Lecture	Weakly and monthly exam
9	Biosynthesis of lactose and sucrose		Lecture	Weakly and monthly exam
10	Light and dark reaction of photosynthesis		Lecture	Weakly and monthly exam
11	Digestion and absorption of lipids,		Lecture	Weakly and monthly exam
12	Oxidation of fatty acids, Biosynthesis		Lecture	Weakly and monthly exam
13	of fatty acids, synthesis of some		Lecture	Weakly and monthly exam
14	classes of lipids, metabolism		Lecture	Weakly and monthly exam
15	of ketone bodies		Lecture	Weakly and monthly exam
16	Digestion and absorption of protein		Lecture	Weakly and monthly exam
17	Transamination , Decarboxylation		Lecture	Weakly and monthly exam
18	The Urea cycle, biosynthesis of		Lecture	Weakly and monthly exam
19	nonessential amino acids,		Lecture	Weakly and monthly exam
20	Biosynthesis of Porphyrin and Creatine		Lecture	Weakly and monthly exam
21	Nucleic acids and Genetics		Lecture	Weakly and monthly exam
22	Cells and heredity		Lecture	Weakly and monthly exam
23	Genetic mutations		Lecture	Weakly and monthly exam
24	Biosynthesis of proteins		Lecture	Weakly and monthly exam