University Name: Al-Muthanna University

Faculty/Institute: science college

Scientific Department: Department of chemistry

Academic or Professional Program Name: Bachelor's degree in Science

Final Certificate Name: Bachelor's degree in chemistry

Academic System: Semester (courses)

Description Preparation Date: april 2024

File Completion Date: 11/4/2024

Signature:

Head of Department Name:

Asst.Prof. Dr. azal Shakir wheeb

Date:28/4/2024

Signature:

Scientific Associate Name:

Asst.Prof. Matham A. makey

Date:28/4/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

M.Sc Saleh A. Lazam

Date: 4/4/2024

Signature:

Approval of the Dean

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

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.

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: ..**AL–Muthanna university**……

Faculty/Institute: …**College of Science**……

Scientific Department: .**Chemistry** ……

Academic or Professional Program Name: ……

Final Certificate Name: ..**B**.**Sc in Chemistry**……

Academic System: ……

Description Preparation Date: **12–6–2024**

File Completion Date: **12–6–2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

Indicative content includes the following.

Part A – Introduction to Periodic Table

Representative elements – Historical development, the first attempts to discover the elements, the oxidation states, Introduce the basis of Hybridization of simple molecules

Part B –The chemistry of representative elements and transition metal (TM)elements- the periodic properties of transition metals, electronic configuration of TMs, their oxidation states, and their general behavior as Lewis acids. 20h

Part C – Provide a details description about the pi bond and the sigma bond, Hydrogen element and Introduce the student to the some of important reactions of hydrogen, Provide a details description of the Acids, Bases, Solvents and their types and properties.

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program? No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*

Institution Requirements				
College Requirements				
Department Requirements				
Summer Training	**yes**			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
TWO		**Chemistry of represented elements 1**	**Theoretical 2**	**Practical** 2

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Introduce the student to the historical background of the discovery of periodic metals to help them develop the notion of thinking like a scientists 2. Introduce the basis of the periodic metals. 3. Explain the classifications of the elements 4. Introduce the idea of chemical valences and periodic properties for the elements
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central

admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
TWO	Ch 215	Chemistry of represented elements 1	(Basic)	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: **Chemistry of represented elements 1**
2. Course Code: **Ch 215**
3. Semester **First course** / Year:2023−2024
4. Description Preparation Date:12−6−2024
5. Available Attendance Forms: 12-6-2024
6. Number of Credit Hours (4) / Number of Units (3) 30 hours theoretical
7. Course administrator's name (mention all, if more than one name)
Name: Haider Shanshool Mohammed Email: haider.shanshool@mu.edu.iq

8. Course Objectives

Course Objectives	• Build basic understanding to the Periodic Table of elements. The study of the periodic table and knowing its characteristics, as well as the knowledge of how the distribution of elements by cliques and courses is calculated and the number of elements in each groups, is important for the student to know the most important qualities of the rotating elements.

9. Teaching and Learning Strategies

Strategy	Because inorganic chemistry is such a broad subject, it must be taught usin variety of instructional strategies. In this course, visual learning will be main learning method used. We will utilize molecular and orbital models help students visualize the interactions between atomic orbitals and bu coordination bonds. Additionally, we will use models to represent comp molecules, providing students with a basic understanding of molecu symmetry and the possible interactions between transition metal centers a different ligands. Our course material includes diverse and colorful scher and figures to convey complicated ideas as straightforwardly as possible. reinforce newly taught concepts, we will provide students with a series exercises to practice and apply their knowledge .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Introduction about the Periodic Ta of Elements**		Lectures+Da Show	Quiz , Exams Report exams
2	4	**Periodic properties and anomalies some properties**		Lectures+Da Show	Quiz , Exams Report exams
3	4	**General oxidation states of element**		Lectures+Da Show	Quiz , Exams Report exams
4	4	**The classification of transition elements**		Lectures+Da Show	Quiz , Exams Report exams
5	4	**Comparison between the pi and sig bonds**		Lectures+Da Show	Quiz , Exams Report exams
6	4	**The hydrogen element's chemistry**		Lectures+Da Show	Quiz , Exams Report exams
7	4	**Some of the important reactions of hydrogen**		Lectures+Da Show	Quiz , Exams Report exams
8	4	**Hydrides of the elements of the periodic table**		Lectures+Da Show	Quiz , Exams Report exams
9	4	**Acids and bases, their types and properties**		Lectures+Da Show	Quiz , Exams Report exams
10	4	**Classification of the Periodic Elements**		Lectures+Da Show	Quiz , Exams Report exams
11	4	**Alkaline elements: general propert -their preparation - their presence**		Lectures+Da Show	Quiz , Exams Report exams
12	4	**Compounds of alkaline elements (Halides - Oxides - Hydrides - Sulf - Similarities between lithium and magnesium**		Lectures+Da Show	Quiz , Exams Report

					exams
13	4	**Alkaline earth elements - general properties - their preparation - the presence**		Lectures+Data Show	Quiz , Exams Report exams

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Inorganic Chemistry for d. Noman Saad Eddin al-Naimi / Section II. Inorganic Chemistry (Chemistry acti elements) Dr. Naji Mahdi Zakum.
Main references (sources)	1. Advanced Inorganic Chemistry. Fourth Edition, John Wiley & Sons, USA. F. Alber Cotton and Geoffrey (1980) 2. Mosul Inorganic Chemistry, Dr. Essam Girgis. jamah Mosul, Mosul, i 1.1982 m. Inorganic comparison and synthetic chemistry autho Moreau translation Mahdi Naji Zakum.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://chem.libretexts.org/Bookshelves/Inorganic_ emistry

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2024

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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: ..**AL–Muthanna university**……

Faculty/Institute: …**College of Science**……

Scientific Department: .**Chemistry** ……

Academic or Professional Program Name: ……

Final Certificate Name: ..**B**.**Sc in Chemistry**……

Academic System: ……

Description Preparation Date: **12–6–2024**

File Completion Date: **12–6–2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

Part A: Boron, carbon, and nitrogen group elements and their compounds:
Clarification of the proportions of the presence of elements in their ores in nature, Addressing the methods of preparing the elements of these groups from their raw materials, Explaining some of the varying properties and their causes within the elements of one group, Studying methods of preparing different chemical compounds of these elements and clarifying their chemical and physical properties.20h

Part B: Oxygen, Flore, and Noble gases Group Elements and Their Compounds
Explain the ratios of elements present in ores in nature, the methods by which the elements of these groups are prepared from their raw materials, explain some of the differences in properties and causes within the elements of one group, study methods of preparing these elements' chemical and physical compounds, and clarify their chemical and physical properties. 21h

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program? No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				
Summer Training	**yes**			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
TWO		**Chemistry of represented elements 2**	**Theoretical 2**	**Practical** 2

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Introduce the student to the historical background of the discovery of periodic metals to help them develop the notion of thinking like a scientists 2. Introduce the basis of the periodic metals. 3. Explain the classifications of the elements 4. Introduce the idea of chemical valences and periodic properties for the elements
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4

Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central

admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
tow	CHE-24020	Chemistry of represented elements 2	(Basic)	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: **Chemistry of represented elements 2**
2. Course Code: CHE-24020
3. Semester **second course** / Year:2023−2024
4. Description Preparation Date:12−6−2024
5. Available Attendance Forms: 12-6-2024
6. Number of Credit Hours (4) / Number of Units (3) 30 hours theoretical
7. Course administrator's name (mention all, if more than one name)
Name: Haider Shanshool Mohammed Email: haider.shanshool@mu.edu.iq
8. Course Objectives

Course Objectives	• Build basic understanding to the Periodic Table of elements. The study of the periodic table and knowing its characteristics, as well as the knowledge of how the distribution of elements by cliques and courses is calculated and the number of elements in each groups, is important for the student to know the most important qualities of the rotating elements.

9. Teaching and Learning Strategies

Strategy	Because inorganic chemistry is such a broad subject, it must be taught usin variety of instructional strategies. In this course, visual learning will be main learning method used. We will utilize molecular and orbital models help students visualize the interactions between atomic orbitals and bu coordination bonds. Additionally, we will use models to represent comp molecules, providing students with a basic understanding of molecu symmetry and the possible interactions between transition metal centers a different ligands. Our course material includes diverse and colorful scher and figures to convey complicated ideas as straightforwardly as possible. reinforce newly taught concepts, we will provide students with a series exercises to practice and apply their knowledge .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Third group (IIIA): The boron gro**		Lectures+Da Show	Quiz , Exams Report exams
2	4	**Boron compounds preparation**		Lectures+Da Show	Quiz , Exams Report exams
3	4	**Fourth group (IV): Carbon group**		Lectures+Da Show	Quiz , Exams Report exams
4	4	**Elements of germanium, tin and le their properties, their preparation, and the most important compound and uses**		Lectures+Da Show	Quiz , Exams Report exams
5	4	**The fifth group (V): The nitrogen group**		Lectures+Da Show	Quiz , Exams Report exams
6	4	**Preparation the fifth group elemen in the laboratory and industry**		Lectures+Da Show	Quiz , Exams Report exams
7	4	**Oxides of the fifth group elements (nitrogen oxides)**		Lectures+Da Show	Quiz , Exams Report exams
8	4	**The sixth group (VI): The oxygen group**		Lectures+Da Show	Quiz , Exams Report exams
9	4	**The peroxides of elements—the mo important of peroxides compounds**		Lectures+Da Show	Quiz , Exams Report exams
10	4	**Elements group (VII): Non - metal (Halogens)**		Lectures+Da Show	Quiz , Exams Report exams
11	4	**halogenic and oxyhalogenic acids**		Lectures+Da Show	Quiz , Exams Report exams
12	4	**Types of bonds that made by the halogen group elements**		Lectures+Da Show	Quiz , Exams Report

					exams
13	4	**Group (VIII): Noble gases**		Lectures+Data Show	Quiz , Exams Report exams

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Inorganic Chemistry for d. Noman Saad Eddin al-Naimi / Section II. Inorganic Chemistry (Chemistry acti elements) Dr. Naji Mahdi Zakum.
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Recommended books and references (scientific journals, reports…)	**Advanced Inorganic Chemistry.Fourth Edition, John Wiley&Sons,USA . F.AlberCotton and Geoffrey(1980)**
Electronic References, Websites	Wikipedia

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

2024

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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: **AL-Muthanna University**
Faculty/Institute: **College of Science**.
Scientific Department: .**Chemistry**
Academic or Professional Program Name: .....
Final Certificate Name: **B.Sc in Chemistry**
Academic System: .....
Description Preparation Date:**1-3-2024**
File Completion Date: **1-3-2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

This module aims to teach you core concepts in physical chemistry including topics on structure of atomic,molcualer Theoretical and principles of structure, functions of molecules and its role in chemistry process. The role of chemistry in the understanding of chemistry systems and sciences. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance performance in the area of physical chemistry.

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program?No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*

Institution Requirements	**3**			
College Requirements				
Department Requirements				
Summer Training	**yes**			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2nd		**Thermodynamic second semester**	**Theoretical 3**	**Practical**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Explain the basic concepts of physical chemistry 2. Recall the structures of molecules and atomic 3. Summaries the relationship between chemical structure and physcis 4. Communicate key practical skills relating specifically to physical chemistry 5. Describe the basic principles of physical/chemical 6. Evaluate essential key facts and theory in a sub discipline of the physical chemistry 7. Describe and begin to evaluate aspects of physical chemistry with reference to textbook material

	8. With guidance, deploy of established techniques of analysis, practical investigation and enquiry within physical chemistry
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.
Professional development of faculty members
Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. **Acceptance Criterion**
(**Setting regulations related to enrollment in the college or institute, whether central admission or others**)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
2nd		Thermodynamic	Basic	√	√	√	√	√	√	√	√	√	√	√	√
														√	√

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

Course Description Form

1. Course Name: Thermodynamic II
2. Course Code:
3. Semester / Year:2023−2024
4. Description Preparation Date:1−3−2024
5. Available Attendance Forms:1-3-2024
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours theoretical
7. Course administrator's name (mention all, if more than one name)
Name: hassan sabih Jaber Email: hassansabih87@mu.edu.iq
8. Course Objectives

Course Objectives	1. Explain the basic concepts of. physical chemistry 2. Recall the structures of molecules and atomic 3. Summaries the relationship between chemical structure for cmpoundes 4. Communicate key practical skills relating specifically to physical chemistry 5. Describe the basic principles of physical

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9. Teaching and Learning Strategies

Strategy	Lectures ,Workshops ,Skills and group work online quizzes,short answer questions ,a problem class ,,Written reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	3		1. The second law of thermodynamics 2. Calcualation of the entropy for ideal gas 3. change in entropy for emixture of ideal gas Carnot cycal 4. Third law of therodynamic Gibbs free energy 5. Helmholtz free enrgy The Gibbs – Helmholtz 6. The master equation closed. system The maxwell equation 7. Chemical potential of an ideal gas	lectures	Quiz , Exams Report exams

			8. Chemical Equilibrium Le- chatelier principle 9. Relationship between Kc and Kp 10. Types of chemical equilibrium Vant Hoff equation 11. Clausius- Clapyeron equation Henry law Raoul law 12. General colligative properties of solution 13. Phase Equilibrium 14. Phase. rule to two compound system 15. Statistical thermodynamics			
11. Course Evaluation						
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc						
12. Learning and Teaching Resources						

Required textbooks (curricular books, if any)		
Main references (sources)	1-Thermodynamic fundamentals. Dr falah Hassan 2-الداينميك الكيميائي والكيمياء الضوئية	
Recommended books and references (scientific journals, reports…)	1-physical chemistry. Atkins 2-Thermodnamic and chemistry. I Howard Devoe	
Electronic References, Websites		

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

2024

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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: ..**AL–Muthanna university**……

Faculty/Institute: …**College of Science**……

Scientific Department: .**Chemistry** ……

Academic or Professional Program Name: ……

Final Certificate Name: ..**B**.**Sc in Chemistry**……

Academic System: ……

Description Preparation Date: **12–6–2024**

File Completion Date: **12–6–2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

Surface chemistry deals with phenomena that occur at the surfaces or interfaces. The interface or surface is represented by separating the bulk phases by a hyphen or a slash. For example, the interface between a solid and a gas may be represented by solid-gas or solid/gas. Due to complete miscibility, there is no interface between the gases. The bulk phases that we come across in surface chemistry may be pure compounds or solutions. The interface is normally a few molecules thick but its area depends on the size of the particles of bulk phases. Many important phenomena, noticeable amongst these being corrosion, electrode processes, heterogeneous catalysis, dissolution and crystallisation occur at interfaces. The subject of surface chemistry finds many applications in industry, analytical work and daily life situations

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program? No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				

Department Requirements				
Summer Training	**yes**			
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
Three		surface chemistry	**2**	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. Some of the most important chemicals are produced industrially by means of reactions that occur on the surfaces of solid catalysts.
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Three		surface chemistry	(selectiv)	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: surface chemistry
2. Course Code:
3. Semester **second course** / Year:2023−2024
4. Description Preparation Date:12−6−2024
5. Available Attendance Forms: 12-6-2024
6. Number of Credit Hours (4) / Number of Units (3) 30 hours theoretical
7. Course administrator's name (mention all, if more than one name)
Name: Haider Shanshool Mohammed Email: haider.shanshool@mu.edu.iq

8. Course Objectives	
Course Objectives	Surface chemistry deals with phenomena that occur at the surfa or interfaces. The interface or surface is represented by separat the bulk phases by a hyphen or a slash. For example, the interf between a solid and a gas may be represented by solid-gas solid/gas. Due to complete miscibility, there is no interface betw the gases. The bulk phases that we come across in surface chemis may be pure compounds or solutions. The interface is normally a molecules thick but its area depends on the size of the particles bulk phases. Many important phenomena, noticeable amongst th being corrosion, electrode processes, heterogeneous cataly dissolution and crystallisation occur at interfaces. The subject surface chemistry finds many applications in industry, analyt work and daily life situations

9. Teaching and Learning Strategies	
Strategy	Some of the most important chemicals are produced industrially by means reactions that occur on the surfaces of solid catalysts. .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	describe interfacial phenomenon and its significance;		Lectures+Da Show	Quiz , Exams Report exams
2	2	• define adsorption and classify it into physical and chemical adsorption;		Lectures+Da Show	Quiz , Exams Report exams
3	2	• explain mechanism of adsorption;		Lectures+Da Show	Quiz , Exams Report exams
4	2	• explain the factors controlling adsorption from gases and solutions on solids;		Lectures+Da Show	Quiz , Exams Report exams
5	2	• explain adsorption results on the basis of Freundlich adsorption isotherms;		Lectures+Da Show	Quiz , Exams Report exams
6	2	• appreciate the role of catalysts in industry;		Lectures+Da Show	Quiz , Exams Report exams
7	2	• enumerate the nature of colloidal state;		Lectures+Da Show	Quiz , Exams Report exams
8	2	• describe preparation, properties and purification of colloids;		Lectures+Da Show	Quiz , Exams Report exams
9	2	• classify emulsions and describe their preparation and properties		Lectures+Da Show	Quiz , Exams Report exams
10	2	• describe the phenomenon of gel formation;		Lectures+Da Show	Quiz , Exams Report exams
11	2	• list the uses of colloids		Lectures+Da Show	Quiz , Exams Report exams
12	2	Definition of Surface Thermodynami Functions		Lectures+Da Show	Quiz , Exams Report exams

13	2	Work Needed to Create a Surface of a One-Component System: Surface Tension		Lectures+Data Show	Quiz , Exams Report exams	

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Surface chemistry d. Jalal Muhammad Saleh (1980 Kinetic physical chemistry Dr. Khaled Issa 1985)	
Main references (sources)	A.W.Adamson, physical chemistry of surfa Wiley New York 1976. S.M Mohocha, porous carbon 2003.	
Recommended books and references (scientific journals, reports…)		
Electronic References, Websites	wikipedia	

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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: ..**AL-Muthana university**.....
Faculty/Institute: ...**College of Science**.....
Scientific Department: .**Chemistry** .....
Academic or Professional Program Name: .....
Final Certificate Name: ..**B.Sc in Chemistry**.....
Academic System: .....
Description Preparation Date: **1-3-2024**
File Completion Date:

Signature:
Head of Department Name:
Azal shakir Waheeb
Date:

Signature:
Scientific Associate Name:
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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

This module aims to teach you core concepts in biochemistry including topics on structure of carbohydrates ,proteins, lipids ,enzyme kinetics. Theoretical and principles of structure, functions of biomolecules and its role in living process. The role of biochemistry in the understanding of living systems and sciences. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance performance in the area of biological.

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program?No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	**2**			
College Requirements				

Department Requirements				
Summer Training	**yes**			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
3rd		**Biochemistry I first semester , Biochemistry II second semester**	**Theoretical 2**	**Practical 2**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Explain the basic concepts of biochemistry 2. Recall the structures of biological molecules 3. Summaries the relationship between chemical structure and biological function 4. Communicate key practical skills relating specifically to biochemistry 5. Describe the basic principles of biochemistry/chemical biology 6. Evaluate essential key facts and theory in a sub discipline of the biosciences 7. Describe and begin to evaluate aspects of biochemistry with reference to textbook material 8. With guidance, deploy of established techniques of analysis, practical investigation and enquiry within biochemistry
Skills	

Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. **Acceptance Criterion**
(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
3rd		Biochemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		Biochemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: Biochemistry I
2. Course Code:
3. Semester / Year:2023−2024
4. Description Preparation Date:1−3−2024
5. Available Attendance Forms: 2024
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours theoretical + 30 hours practical
7. Course administrator's name (mention all, if more than one name)
Name: Muna Hasson Saoudi Email: muna.hasson@mu.edu.iq
8. Course Objectives

Course Objectives	1. Explain the basic concepts of biochemistry 2. Recall the structures of biological molecules 3. Summaries the relationship between chemical structure and biological function 4. Communicate key practical skills relating specifically to biochemistry 5. Describe the basic principles of biochemistry/chemical biology 6. Evaluate essential key facts and theory in a sub discipline of the biosciences 7. Describe and begin to evaluate aspects of biochemistry with reference to textbook material 8. With guidance, deploy of established techniques of analysis, practical investigation and enquiry

	within biochemistry

9. Teaching and Learning Strategies

Strategy	Lectures ,Practicals ,Workshops ,Skills and group work online quizzes,short answer questions ,a problem class ,Practical labs ,Written reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	2		1- Molecules and life ,origin biomolecules ,macromolecules 2- Cells components, water solution 3- Carbohydrates, importan Function 4- classification, optical acti ,cyclic structures of saccharides 5- Monosaccharaides, glycos formation ,de-oxy sacchari amino sugars 6- Alcoholic sugars, disacchar ,polysaccharides 7- Proteins, amino acids ,gen properties ,types of amino a ,chemical reactions 8-Peptides, isolation characterization ,sequence of an acids in peptides 9- Proteins ,definition ,func ,classification ,structure of prote 10- Nucleic acids ,struc ,nucleotides function ,nitro basis, nucleosides. 11- DNA ,RNA, synthesis nucleic acids , chemical enzymatic hydrolysis of nuc acids 12- Lipids ,classification ,phys properties, chemical reactions and oil . carotenoids, 13- Fatty acids, phospholip steroids, terpines ,glycolipids 14- **Preparatory week before the final Exam**	lectures	Quiz , Exams Report exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc		
12. Learning and Teaching Resources		
Required textbooks (curricular books, if any)		
Main references (sources)	Garrett, R.H., & Grisham, CM., Principles of Biochemistry: With a Human Focus, Harcourt College Publishers, Fort Worth, 2002 Nelson, D.L., & Cox, M.M., et al, Lehninger Principle Biochemistry, (7th. ed) W.H. Freeman, New York, 2017	
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Faculty/Institute: ...**College of Science**.....
Scientific Department: .**Chemistry** .....
Academic or Professional Program Name: .....
Final Certificate Name: ..**B.Sc in Chemistry**.....
Academic System: .....
Description Preparation Date: **1-3-2024**
File Completion Date: **1-3-2024**

Signature:	**Signature**:
Head of Department Name:	**Scientific Associate Name**:
Azal Shakir Waheeb	
Date:	**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

Program vision is written here as stated in the university's catalogue and website.

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Program mission is written here as stated in the university's catalogue and website.

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4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program?No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	**2**			
College Requirements				

Department Requirements				
Summer Training	**yes**			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
3rd		**BiochemistryIII first semester , BiochemistryIV second semester**	**Theoretical 2**	**Practical 2**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	1. Describe the key biochemical pathways involved in the metabolism of carbohydrates, lipids, and proteins. 2. Explain the regulation and coordination of metabolic pathways in response to different physiological conditions. 3. Analyze the energy transformations occurring during various metabolic processes. 4. Understand the interplay between anabolic and catabolic pathways and their significance in maintaining cellular homeostasis. 5. Apply biochemical knowledge to interpret metabolic disorders and their underlying mechanisms. Critically evaluate current research and advancements in the field of metabolism.
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
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Professional Development

Mentoring new faculty members

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Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
4th		Biochemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		Biochemistry IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: Biochemistry III
2. Course Code:
3. Semester / Year:2023−2024
4. Description Preparation Date:1−3−2024
5. Available Attendance Forms: 1-3-2024
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours theoretical + 30 hours practical
7. Course administrator's name (mention all, if more than one name)
Name: Muna Hasson Saoudi Email: muna.hasson@mu.edu.iq

8. Course Objectives	
Course Objectives	1-To provide students with a comprehensive understanding of the fundamental principles and processes of biochemistry, specifically focusing on metabolism. 2-To explore the biochemical pathways involved in the synthesis, breakdown, and interconversion of biomolecules. 3-To develop students' analytical and problem-solving skills in applying biochemical knowledge to biological systems. 4-To foster an appreciation for the role of metabolism in cellular functions, human health, and disease.

9. Teaching and Learning Strategies	
Strategy	Lectures ,Practicals ,Workshops ,Skills and group work online quizzes,short answer questions ,a problem class ,Practical labs ,Written reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2		1-Introduction of metabol glycolysis 2- Fate of pyruvate under aerobic anaerobic condition 3- Gluconeogensis 4- Pentose phosp pathway,regulation of glycolysis gluconeogenesis 5- Glycogen synthesis breackdown,regulation of glyco metabolism 6- Citric acid cycle,regulation of TC 7- Oxidation of fatty acids 8- Ketone bodies 9- Fatty acids biosynthesis 10- Biosynthesis of triacylglyce and cholesterol 11- Proteins metabolism-oxidation amino acid, 12- Urea cycle,pathways of amino degradation 13- Degradation of amino acids pyruvate 14- Convert of amino acids to gluc or to ketone bodies 15- Biosynthesis of amino acids	lectures	Quiz , Exams Report exams

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)		
Main references (sources)	Garrett, R.H., & Grisham, CM., Principles of Biochemistry: With a Human Focus, Harcourt College Publishers, Fort Worth, 2002 Nelson, D.L., & Cox, M.M., et al, Lehninger Principle Biochemistry, (7th. ed) W.H. Freeman, New York, 2017	
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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.

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: **AL-Muthanna University**
Faculty/Institute: **College of Science**
Scientific Department: .**Chemistry**
Academic or Professional Program Name: .....
Final Certificate Name: **B.Sc in Chemistry**
Academic System: .....
Description Preparation Date: **1-3-2024**
File Completion Date: **1-3-2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

This module aims to teach you core concepts in physical chemistry including topics on structure of atomic,molcualer Theoretical and principles of structure, functions of molecules and its role in chemistry process. The role of chemistry in the understanding of chemistry systems and sciences. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance performance in the area of physical chemistry.

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes.

5. Other external influences

Is there a sponsor for the program?No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	3			
College Requirements				
Department Requirements				
Summer Training	yes			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
4th		molculer spectroscopy second semester	Theoretical 3	Practical

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Explain the basic concepts of physical chemistry 2. Recall the structures of molecules and atomic 3. Summaries the relationship between chemical structure and physcis 4. Communicate key practical skills relating specifically to physical chemistry 5. Describe the basic principles of physical/chemical

	6. Evaluate essential key facts and theory in a sub discipline of the physical chemistry 7. Describe and begin to evaluate aspects of physical chemistry with reference to textbook material 8. With guidance, deploy of established techniques of analysis, practical investigation and enquiry within physical chemistry
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

	chemistry	physical chemistry			√	

Professional Development
Mentoring new faculty members
Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.
Professional development of faculty members
Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(**Setting regulations related to enrollment in the college or institute, whether central admission or others**)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
4th		molculer spectroscopy	Basic	√	√	√	√	√	√	√	√	√	√	√	√
														√	√

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

Course Description Form

1. Course Name: molculer spectroscopy
2. Course Code:
3. Semester / Year:2023−2024
4. Description Preparation Date:1−3−2024
5. Available Attendance Forms:1-3-2024
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours theoretical
7. Course administrator's name (mention all, if more than one name)
Name: hassan sabih Jaber Email: hassansabih87@mu.edu.iq
8. Course Objectives

Course Objectives	1. Explain the basic concepts of. physical chemistry 2. Recall the structures of molecules and atomic 3. Summaries the relationship between chemical structure for cmpoundes 4. Communicate key practical skills relating specifically to physical chemistry 5. Describe the basic principles of physical

	/chemical science 6. Evaluate essential key facts and theory in a sub discipline of the physical chemistry 7. Describe and begin to evaluate aspects of physical chemistry with reference to textbook material 8. With guidance, deploy of established techniques of analysis, practical investigation and enquiry within physical chemistry

9. Teaching and Learning Strategies

Strategy	Lectures ,Workshops ,Skills and group work online quizzes,short answer questions ,a problem class ,,Written reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	3		1. Introduction of molecular Spectroscopy and Electrometric Radiation 2. Regions of the spectrum and type molecular according to moment of inertia 3. Rotational spectra and level energy rotational 4. Rigid rotor 5. Spectra line intensities and stark effect and effect of Iso topic 6. Non- Rigid Rotor	lectures	Quiz , Exams Report exams

			7. Application and Instrumentation 8. The vibration spectra for Diatomic 9. Simple harmonic oscillator 10. An harmonic oscillator 11. Vibration- rotation spectrum for molecular diatomic 12. Molecular Electronic spectra 13. Selection rule of electronic spectra 14. Nuclear magnetic Resonance (N.MR) spectra 15. Chemical shifts			
11. Course Evaluation						
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc						
12. Learning and Teaching Resources						

Required textbooks (curricular books, if any)		
Main references (sources)	1-molculer spectroscopy- Banwall 2-Introduction to molculer spectroscopy- Barrow	
Recommended books and references (scientific journals, reports…)	1-Quantum chemistry and molcu spectroscopy 2- spectrum of analysis	
Electronic References, Websites		

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

2024

Introduction:

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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: ..**AL–Muthanna university**……

Faculty/Institute: …**College of Science**……

Scientific Department: .**Chemistry** ……

Academic or Professional Program Name: ……

Final Certificate Name: ..**B**.**Sc in Chemistry**……

Academic System: ……

Description Preparation Date: **12–6–2024**

File Completion Date: **12–6–2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

This module aims to teach you core concepts in biochemistry including topics on structure of carbohydrates ,proteins, lipids ,enzyme kinetics. Theoretical and principles of structure, functions of biomolecules and its role in living process. The role of biochemistry in the understanding of living systems and sciences. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance performance in the area of biological.

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes .

5. Other external influences

Is there a sponsor for the program? No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				

Summer Training	**yes**			
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**
Four		**Natural products** **first semester**	**2**	–

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	On successfully completing the module you will be able to.. 1. Explain the basic concepts of Natural products 2. Recall the structures of Natural products 3. Communicate key practical skills relating specifically to Natural products
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

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

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Four		Natural products	(Elective)	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name: **Natural products**

2. Course Code:

3. Semester **First course** / Year:2023−2024

4. Description Preparation Date:12−6−2024

5. Available Attendance Forms: 12-6-2024

6. Number of Credit Hours (2) / Number of Units (2) 30 hours theoretical

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

Name: Asstabraq Mohsin Yasir
Email: Asstabraq@mu.edu.iq

8. Course Objectives

Course Objectives	The chemistry of natural products course aims to clarify what are the two type natural products (primary and secondary metabolites) and their most impor natural sources (animal, plant, microorganisms or marine organisms), t classification, methods of extraction, separation and purification from their nat sources, and a description of their chemical composition and methods of synth biological, laboratory and active. Balogism and the relationship of baculost activity to its chemical composition) and what are the most important familie organic chemical compounds representing each type and the difference betw them and the rest of the organic compounds

9. Teaching and Learning Strategies

Strategy	Lectures ,Practical ,Workshops ,Skills and group work online quizzes, short answer questions ,a problem class ,Practical labs ,Written reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	**Introduction about natural products**		Lectures+Data Show	Quiz , Exams Report exams
2	2	**Separation of natural products**		Lectures+Data Show	Quiz , Exams Report exams
3	2	**turbines**		Lectures+Data Show	Quiz , Exams Report exams
4	2	**Separation of turbines**		Lectures+Data Show	Quiz , Exams Report exams
5	2	**Tannians**		Lectures+Data Show	Quiz , Exams Report exams
6	2	**Separation of tannins**		Lectures+Data Show	Quiz , Exams Report exams
7	2	**Kumarin s**		Lectures+Data Show	Quiz , Exams Report exams
8	2	***Alkaloid***		Lectures+Data Show	Quiz , Exams Report exams
9	2	**Classification of alkaloid**		Lectures+Data Show	Quiz , Exams Report exams
10	2	**Volatile oils**		Lectures+Data Show	Quiz , Exams Report exams
11	2	**Importance of volatile oils**		Lectures+Data Show	Quiz , Exams Report exams
12	2	**vitamins**		Lectures+Data Show	Quiz , Exams Report exams
13	2	**Importance of vitamins**		Lectures+Data Show	Quiz , Exams Report exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	

Required textbooks (curricular books, if any)		
Main references (sources)		
Recommended books and references (scientific journals, reports…)		
Electronic References, Websites		