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

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: Tikrit.....

Faculty/Institute: .....College institute college.....

Scientific Department: ..... Organic....chemistry

Academic or Professional Program Name: Ph.D Organic chemistry.....

Final Certificate Name: ..Bachelor Degree

Academic System: ...Semester.....

Description Preparation Date:2/6/2026

File Completion Date: 2/6/2026

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**
General statements describing what the program or institution intends to achieve.

4. **Program Accreditation**
Does the program have program accreditation? And from which agency?

5. **Other external influences**
Is there a sponsor for the program?

6. **Program Structure**

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	90	90		
College Requirements	Yes			
Department Requirements	Yes			
Summer Training	Nothing			

Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2023/2024 Third		Organic chemistry	theoretical	Practical

8. Expected learning outcomes of the program

Knowledge	
1- Enabling students to acquire knowledge and understanding of general theoretical chemistry. 2- Enabling students to acquire knowledge and understanding of solubility concepts. 3- Enabling students to acquire knowledge and understanding of melting and boiling. 4- Enabling students to acquire knowledge and understanding of the melting of potassium. 5- Enabling students to acquire knowledge and understanding of the total number of compounds.	Learning Outcomes Statement 1
Skills	
6- Knowledge skills and memory 7- Thinking skills. 8- Comparison and analysis skills> 9- Development skills.	Learning Outcomes Statement 2
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4

Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

1. Lectures using interactive whiteboard technology.
2. Clear explanations and illustrations.
3. – Forming discussion groups during thematic lectures on diagnostic chemistry.
4. Formation of discussion groups during lectures to facilitate exploration of kinetics and electrochemistry topics.
5. Encouragement of critical thinking through targeted questions (what, how, when, and why) on specific topics.
6. Assignment of homework that requires students to provide personal explanations and causal reasoning.
7. Assignment of laboratory activities that reinforce course material.

10. Evaluation methods

Weekly ,monthly, daily and finel exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Ph.D	Chemistry	Organic			Angel	

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
Centralized system

13. The most important sources of information about the program
Central sources approved by the spectral committee for science colleges at the ministry of higher education and scientific research - Methodological, source and internet sources .

14. Program Development Plan
Updating curricula according to modem scientific discoveries

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

2023/2024		Organic chemstry	essential	yes	yes	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes

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

Course Description Form

1. Course Name:
2. Theoretical Organic Chemistry
3. Course Code:
4. Semester / Year:
2-6-2026
5. Description Preparation Date:
2-6-2026
6. Available Attendance Forms:
My presence only
7. Number of Credit Hours (Total) / Number of Units (Total)
45 hours percourse
8. Course administrator's name (mention all, if more than one name)
Name: Tohama Baban Abdallah
9. Course Objectives

1. To enable students to develop problen solving skills related to the course material. 2. To equip students with the knowledge and skills to use spectrophotometers an conduct kinetic experiments. 3. To provide students with an understanding of the use and applicatio of pH meters and conductometric device 4. To enable students to develop numeri problem-solving skills.	● ..... ● ..... ● .....

10. Teaching and Learning Strategies	
1. Concept mapping cooperative learning strategy. 2. Brainstorming teaching strategy. 3. Observation-based learning strategy.	

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introducing the student to organic diagnosis.	Introduction to organic diagnostics.	My theory in the laborator	Oral questions
2	3	Introducing solubility to the student.	Solubility tests.	the laborator	Lecture Oral questior
3	3	Introducing the student to the first solubility test.	Water-soluble and ether-insoluble tests.	the laborator	Lecture Oral questions
4	3	Introducing the second solubility test.	Sodium hydroxide test.	the laborator	Oral questions
5	3	Introducing the third solubility test.	Hydrochloric acid test.	the laborator	Lecture Oral questions
6	3	Introducing the fourth solubility test.	Sulfuric acid test.	the laborator	Oral questions
7	3		Exam.		Written exam
8	3		Discussion.		Discussion
9	3	Learn about melting and boiling points.	Measuring melting and boiling points.	the laborator	Oral questions
10	3	Learn about the melting point of sodium.	Introduction to the sodium fusion test.	the laborator	Oral questions
11	3	Learn about functional group detection.	Introduction to functional group tests.	the laborator	Lecture Oral questions
12	3	Learn about aldehydes and ketones.	Barday's test.	the laborator	Lecture Oral questions
13	3	Learn about double bond detection.	Bayer's test.	the laborator	Lecture Oral questions
14	3		Exam.		Written ,exam
15	3		Discussion.		on Discussion

12. 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

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
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

2025

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: ...Tikrit

Faculty/Institute: ..Science.....

Scientific Department: ...Chemistry.....

Academic or Professional Program Name: B.SC.....

Final Certificate Name: .B.SC in chemistry.....

Academic System: Semester.....

Description Preparation Date: 2025-2026

File Completion Date: 2025

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
General statements describing what the program or institution intends to achieve.

4. Program Accreditation
Does the program have program accreditation? And from which agency?

5. Other external influences
Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	1	30		essential
College Requirements	yes			
Department Requirements	yes			

Summer Training	nothing			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
		Instrumental analysis	theoretical	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1
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.

Daily and monthly exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (If applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Ass.prof	Chemistry	Analysis chemistry			Staff	

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.

Instrumental analysis main book

John wiley&sons

14. Program Development Plan

Study and compare analytical techniques and the results obtained from each technique

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
2023-2024		Insrumental analysis	Basic												

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

Course Description Form

1. Course Name:
Instrumental analysis
2. Course Code:
3. Semester / Year:
Semester
4. Description Preparation Date:
2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30H/2H Per week
7. Course administrator's name (mention all, if more than one name)
Name: Ass.Prof. Sarhan Ali Salman Email: sarhan.ali@tu.edu.iq
8. Course Objectives

Course Objectives	**Understand the techniques instrumental analysis.....** • **Expanding your skill reviewing g references.....** • **.....**

9. Teaching and Learning Strategies	
Strategy	
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding t lecture	Introduction	Power.po	Short exam
2	2	Understanding lecture	Types of inst.	Power.p Oint	Short exam
3	2	Uderst.lec	Phot.method	Pow.poin	Short.ex
4	2	Underst.lectu	UV-Visibl	Pow.poin	Short.ex
5	2	Underst.lectu	UV-Visibl-2	Pow.poin	Short.exa
6-	2	Underst.lectu	IR	Pow.poin	Short.exam
7-	2	Exam.	Monthly.exam		
8	2	Unders.lectu	A.A.S	Pow.poin	Short.exam
9	2	Unders.lectu.	A.E.S	Pow.poin	Short.exam
10	2	Unders.lectu	F.A.S	Pow.poin	Short.exam
11	2	Unders.lectu	Turbidity	Pow.poin	Short.exam
12	2	Unders.lectu	S.Polarization	Pow.poin	Short.exam
13	2	Unders.lectu	X-Ray	Pow.poin	Short.exam
14	2	Unders.lectu	F.Ingection	Pow.poin	Short.exam
15	2	Examination	Monthly exam		Examination

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)	Jon&welly
Main references (sources)	Instrumental analysis book
Recommended books and references (scientific journals, reports...)	
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

2025

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.

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: .....Tikrit.....

Faculty/Institute: ..Gollege institute college.....

Academic Program Description Form

University Name: .....Tikrit.....

Faculty/Institute: ..Gollege institute college.....

Scientific Department: .....Chemistry.....

Academic or Professional Program Name: Bachelor of Science in Chemistry.....

Final Certificate Name: ...Bachelor Degree

Academic System: Semester.....

Description Preparation Date: 10 /9/2025

File Completion Date: 14 /5 / 2026

Signature:

Head of Department Name:

Date:

استاذ دكتور
فائز محسن العبادي
رئيس قسم الكيمياء

Signature:

أ.م.د فراس فارس رجا
معاون العميد للشؤون العلمية
والدراسات العليا

Scientific Associate Name:
Noor Hasan Ali

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

شعبة الجودة والأداء الجامعي

Approval of the Dean

الأستاذ الدكتور
عبد الخالق علوان مجيميد
عميد كلية العلوم

Year/Level	Course Code	Course Name	Credit Hours	
2025 -2026 / fourth		Theoretical biochemistry	theoretical	

8. Expected learning outcomes of the program	
Knowledge	
1- Enabling students to gain knowledge and understanding of theoretical biochemistry 2- The student's knowledge of the concept of biochemistry and clinical and adapting to solve problems 3- The student designs a plan to study the vocabulary of biochemistry in a new way 4- The student learns the terms of biochemistry and their scientific analyses with their connotations 5- Enabling students to know the metabolic pathways of the human body and study their effect on the incidence of various diseases and study scientific solutions for them	
Skills	
1- Knowledge skills - memory 2- Self-development skills 3- Analysis, measurement and information gathering skills in a scientific and systematic manner 4- The ability to express ideas clearly and confidently in speech	
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

Course Description Form

1. Course Name: Biochemistry
2. Course Code:
3. Semester / Year: courses
2025 – 2026
4. Description Preparation Date: 16 / 9 / 2025
5. Available Attendance Forms: my presence only
6. Number of Credit Hours (Total) / Number of Units (Total) : 45 hours percou
7. Course administrator's name (mention all, if more than one name)
Name: Noor Hasan Ali Email: noor.hassan@tu.edu.iq
8. Course Objectives

1- Delivering a general idea about biochemistry a its branches and the importance of this course other departments and specializations, and a providing students with some skills that ma them familiar with the most important topics t they may encounter in daily practical life. Preparing efficient and specialized cadres in field of biochemistry in Iraq.	• ..... • ..... • .....

9. Teaching and Learning Strategies	
Strategy	1- Teaching strategy Collaborative concept planning. 2- Teaching strategy Brainstorming. 3- Teaching strategy Notes series

8. Expected learning outcomes of the program	
Knowledge	
1- Enabling students to gain knowledge and understanding of theoretical biochemistry 2- The student's knowledge of the concept of biochemistry and clinical and adapting to solve problems 3- The student designs a plan to study the vocabulary of biochemistry in a new way 4- The student learns the terms of biochemistry and their scientific analyses with their connotations 5- Enabling students to know the metabolic pathways of the human body and study their effect on the incidence of various diseases and study scientific solutions for them	
Skills	
1- Knowledge skills - memory 2- Self-development skills 3- Analysis, measurement and information gathering skills in a scientific and systematic manner 4- The ability to express ideas clearly and confidently in speech	
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies
1- How to give lectures and use the smart board 2- Explaining and clarifying the scientific material by drawing diagrams and equations on the board

3- Displaying illustrative paths on the screen and using the data show to display videos related to the scientific material

4- Giving students homework

5- Assigning students extracurricular activities such as posters related to the material

10. Evaluation methods

Weekly, monthly, daily and end of semester exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
1- Professor	Chemistry	Biochemistry			Angel	
2- Doctor teacher	Chemistry	Biochemistry			Angel	

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

Centralized system

13. The most important sources of information about the program

- Central sources approved by the committee for determining sources and curricula for science colleges in the Ministry of Higher Education and Scientific Research
- Basics of Biochemistry book, Biochemistry book
- Virtual electronic library, reliable references from the Internet
- Books and research published by Iraqi universities and reliable international universities

14. Program Development Plan

Including topics that are in line with modernity and the requirements of scientific and practical life. Updating curricula according to modern scientific discoveries and research.

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
				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Course Description Form

1. Course Name: Biochemistry

2. Course Code:

3. Semester / Year: courses

2025– 2026

4. Description Preparation Date: 16 / 9 / 2025

5. Available Attendance Forms: my presence only

6. Number of Credit Hours (Total) / Number of Units (Total) : 45 hours percou

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

Name: Noor Hasan Ali
Email: noor.hassan@tu.edu.iq

8. Course Objectives

1- Delivering a general idea about biochemistry a its branches and the importance of this course other departments and specializations, and a providing students with some skills that ma them familiar with the most important topics t they may encounter in daily practical life. Preparing efficient and specialized cadres in field of biochemistry in Iraq.	• ..... • ..... • .....

9. Teaching and Learning Strategies

Strategy	1- Teaching strategy Collaborative concept planning. 2- Teaching strategy Brainstorming. 3- Teaching strategy Notes series

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the topic lecture	Introduction to metabolic process Definition of metabolism, metabolic reaction in metabolic pathways	Explain the material and display it on the screen.	Oral questions
2	3	Understand the topic the lecture	Stages of metabo processes, regulation of metabolic pathways, enzym in metabolism	Explain the material and display it on the screen.	Lecture Oral questions
3	3	Understand the topic the lecture	Carbohydrate metabolism and metabolic processes, glycolysis pathw glucose digestion and absorption	Explain the material and display it on the screen.	Lecture Oral quest
4	3	Understand the topic the lecture	Alcoholic fermentation, anaerobic respiration, Cori cycle, diabetes	Explain the material and display it on the screen.	Oral questions
5	3	Understand the topic the lecture	Entry of other sugars into the glycolytic pathw regulation of the pathway and acti of the enzyme lactate dehydrogenase	Explain the material and display it on the screen.	Lecture Oral questic
6	3	Understand the topic the lecture	Additional aspec of carbohydrate metabolism, gluconeogenesis pathway	Explain the material and display it on the screen.	Lecture Oral questio
7	3	Understand the topic the lecture	Pentose phospha pathway, carbohydrate metabolism enzyme deficien diseases	Explain the material and display it on the screen.	Oral questions

8	3	Understand the topic the lecture	Monthly exam	First month exan	Written exam
9	3	Understand the topic the lecture	Glycogen metabolism, glycogen synthes and breakdown	Explain the material and display it on the screen.	Lecture Oral questic
10	3	Understand the topic the lecture	Glycogen metabolism pathway regulati Glycogen metabolism enzyme deficienc diseases	Explain the material and display it on the screen.	Lecture Oral questions
11	3	Understand the topic the lecture	Krebs cycle, cycle organization	Explain the material and display it on the screen.	Oral questions
12	3	Understand the topic the lecture	Electron transfer and oxidative phosphorylation	Explain the material and display it on the screen.	Lecture Oral questions
13	3	Lecture Oral questior	Glyoxylate cycle, current reactions matrix cycle	Explain the material and display it on the screen.	Written exam
14	3	Introducing students new laboratory equipment that enabl them to acquire new skills and information	Explain the importance of devices in measuring hormones and enzymes involve in metabolic pathways	Explain the material and display it on the screen	Lecture Oral questions
15	3	My presence	My presence	Monthly exam	In-person exam

11. Course Evaluation

Distribution as follows: The grade is distributed out of 100, which is 50 for annual effort and 50 for the final exam at the end of the semester. The effort grade is distributed into a monthly exam grade, a daily exam grade, reports, activities, and homework.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific	

journals, reports…)	
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

2026-2025

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: .....Tikrit.....

Faculty/Institute: ..Gollege institute college.....

Scientific Department: .....Chemistry.....

Academic or Professional Program Name: Bachelor of Science in Chemistry.....

Final Certificate Name: **Bachelor Degree**

Academic System: Semester.....

Description Preparation Date: 5 /10/2025

File Completion Date: 14 /2 / 2026

Signature:

Head of Department Name:

Date:

استاذ دكتور
فائز محسن العبادي
رئيس قسم الكيمياء

Signature:

Scientific Associate Name:

أ.م.د. فراس خليل جاسم
معاون العميد للشؤون العلمية
والدراسات العليا

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 9/10/2025

Signature:

Approval of the Dean

أ.د. عبد الخالق غلوان محيسن
عميد كلية العلوم

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

General statements describing what the program or institution intends to achieve.

4. Program Accreditation

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

5. Other external influences

Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	90	90		Basic Course
College Requirements	Yes			
Department Requirements	Yes			
Summer Training	nothing			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2026 -2025 / fourth		Theoretical biochemistry	theoretical	

8. Expected learning outcomes of the program

Knowledge	
1- Enabling students to gain knowledge and understanding of theoretical biochemistry 2- The student's knowledge of the concept of biochemistry and clinical and adapting to solve problems 3- The student designs a plan to study the vocabulary of biochemistry in a new way 4- The student learns the terms of biochemistry and their scientific analyses with their connotations 5- Enabling students to know the metabolic pathways of the human body and study their effect on the incidence of various diseases and study scientific solutions for them	
Skills	
1- Knowledge skills - memory 2- Self-development skills 3- Analysis, measurement and information gathering skills in a scientific and systematic manner 4- The ability to express ideas clearly and confidently in speech	
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

1- How to give lectures and use the smart board

2- Explaining and clarifying the scientific material by drawing diagrams and equations on the board

3- Displaying illustrative paths on the screen and using the data show to display videos related to the scientific material

4- Giving students homework

5- Assigning students extracurricular activities such as posters related to the material

10. Evaluation methods

Weekly, monthly, daily and end of semester exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
1- Professor	Chemistry	Biochemistry			Angel	
2- Assistant Professor Dr.	Chemistry	Biochemistry			Angel	

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**
Centralized system

13. **The most important sources of information about the program**
- Central sources approved by the committee for determining sources and curricula for science colleges in the Ministry of Higher Education and Scientific Research - Basics of Biochemistry book, Biochemistry book - Virtual electronic library, reliable references from the Internet - Books and research published by Iraqi universities and reliable international universities

14. Program Development Plan
Including topics that are in line with modernity and the requirements of scientific and practical life. Updating curricula according to modern scientific discoveries and research.

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
				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Course Description Form

1. Course Name: Biochemistry

2. Course Code:

3. Semester / Year: courses

2026 – 2025

4. Description Preparation Date: 5 / 10 / 2025

5. Available Attendance Forms: my presence only

6. Number of Credit Hours (Total) / Number of Units (Total) : 45 hours percou

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

Name: Sheerin Farouq Shaker
Email: sheerinfaroksh@tu.edu.iq

8. Course Objectives

1- **Delivering a general idea about biochemistry a its branches and the importance of this course other departments and specializations, and a providing students with some skills that ma them familiar with the most important topics t they may encounter in daily practical life. Preparing efficient and specialized cadres in field of biochemistry in Iraq.**	• ..... • ..... • .....

9. Teaching and Learning Strategies

Strategy	1- Teaching strategy Collaborative concept planning. 2- Teaching strategy Brainstorming. 3- Teaching strategy Notes series

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the topic lecture	Introduction to metabolic process Definition of metabolism, metabolic reaction in metabolic pathways	Explain the material and display it on the screen.	Oral questions
2	3	Understand the topic the lecture	Stages of metabo processes, regulation of metabolic pathways, enzym in metabolism	Explain the material and display it on the screen.	Lecture Oral questions
3	3	Understand the topic the lecture	Carbohydrate metabolism and metabolic processes, glycolysis pathw glucose digestion and absorption	Explain the material and display it on the screen.	Lecture Oral quest
4	3	Understand the topic the lecture	Alcoholic fermentation, anaerobic respiration, Cori cycle, diabetes	Explain the material and display it on the screen.	Oral questions
5	3	Understand the topic the lecture	Entry of other sugars into the glycolytic pathwa regulation of the pathway and acti of the enzyme lactate dehydrogenase	Explain the material and display it on the screen.	Lecture Oral questic
6	3	Understand the topic the lecture	Additional aspec of carbohydrate metabolism, gluconeogenesis pathway	Explain the material and display it on the screen.	Lecture Oral questio
7	3	Understand the topic the lecture	Pentose phospha pathway, carbohydrate metabolism enzyme deficien diseases	Explain the material and display it on the screen.	Oral questions

8	3	Understand the topic the lecture	Monthly exam	First month exan	Written exam
9	3	Understand the topic the lecture	Glycogen metabolism, glycogen synthes and breakdown	Explain the material and display it on the screen.	Lecture Oral questic
10	3	Understand the topic the lecture	Glycogen metabolism pathway regulati Glycogen metabolism enzyme deficien diseases	Explain the material and display it on the screen.	Lecture Oral questions
11	3	Understand the topic the lecture	Krebs cycle, cycle organization	Explain the material and display it on the screen.	Oral questions
12	3	Understand the topic the lecture	Electron transfer and oxidative phosphorylation	Explain the material and display it on the screen.	Lecture Oral questions
13	3	Lecture Oral question	Glyoxylate cycle, current reactions matrix cycle	Explain the material and display it on the screen.	Written exam
14	3	Introducing students new laboratory equipment that enabl them to acquire new skills and information	Explain the importance of devices in measuring hormones and enzymes involve in metabolic pathways	Explain the material and display it on the screen	Lecture Oral questions
15	3	My presence	My presence	Monthly exam	In-person exam

11. Course Evaluation

Distribution as follows: The grade is distributed out of 100, which is 50 for annual effort and 50 for the final exam at the end of the semester. The effort grade is distributed into a monthly exam grade, a daily exam grade, reports, activities, and homework.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific	

journals, reports…)	
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

2025

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

Scientific Department: .....Chemistry.....

Academic or Professional Program Name: Bachelor of Science in Chemistry.....

Final Certificate Name: **Bachelor Degree**

Academic System: Semester.....

Description Preparation Date: 5 /10/2025

File Completion Date: 14 /2 / 2026

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: 9/10/2025

Signature:

Approval of the Dean

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

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
General statements describing what the program or institution intends to achieve.

4. Program Accreditation
Does the program have program accreditation? And from which agency?

5. Other external influences
Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	1	30		essential
College Requirements	yes			
Department Requirements	yes			

Summer Training	nothing			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
		Instrumental analysis	theoretical	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1
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.

Daily and monthly exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (If applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Ass.prof	Chemistry	Analysis chemistry			Staff	

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. Instrumental analysis main book John wiley&sons

14. Program Development Plan
Study and compare analytical techniques and the results obtained from each technique

Course Description Form

1. Course Name:
Instrumental analysis
2. Course Code:
3. Semester / Year:
Semester
4. Description Preparation Date:
2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30H/2H Per week
7. Course administrator's name (mention all, if more than one name)
Name: Ass.Prof. Sarhan Ali Salman Email: sarhan.ali@tu.edu.iq
8. Course Objectives

Course Objectives	**Understand the techniques instrumental analysis.....** • **Expanding your skill reviewing g references.....** • **.....**

9. Teaching and Learning Strategies	
Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding t lecture	Introduction	Power.po	Short exam
2	2	Understanding lecture	Types of inst.	Power.p Oint	Short exam
3	2	Uderst.lec	Phot.method	Pow.poin	Short.ex
4	2	Underst.lectu	UV-Visibl	Pow.poin	Short.ex
5	2	Underst.lectu	UV-Visibl-2	Pow.poin	Short.exa
6-	2	Underst.lectu	IR	Pow.poin	Short.exam
7-	2	Exam.	Monthly.exam		
8	2	Unders.lectu	A.A.S	Pow.poin	Short.exam
9	2	Unders.lectu.	A.E.S	Pow.poin	Short.exam
10	2	Unders.lectu	F.A.S	Pow.poin	Short.exam
11	2	Unders.lectu	Turbidity	Pow.poin	Short.exam
12	2	Unders.lectu	S.Polarization	Pow.poin	Short.exam
13	2	Unders.lectu	X-Ray	Pow.poin	Short.exam
14	2	Unders.lectu	F.Ingection	Pow.poin	Short.exam
15	2	Examination	Monthly exam		Examination

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)	Jon&welly
Main references (sources)	Instrumental analysis book
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

وزارة التعليم العالي والبحث العلمي
جـــهاز الإشـــراف والتقـويم العلـمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد

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

Academic Program and Course Description Guide

2025-2026

Academic Program Description Form

University Name: Tikrit.....

Faculty/Institute: .....College institute college.....

Scientific Department: .....chemistry

Academic or Professional Program Name: Bachelor of Science in physical chemistry.....

Final Certificate Name: ..Bachelor Degree..

Academic System: ...Semester.....

Description Preparation Date:10/9/2025

File Completion Date: 14/2/2026

Signature:

Head of Department Name:

استاذ دكتور
فائز محسن العبادي
رئيس قسم الكيمياء

Date:

Signature:

أ.م.د فراس فارس رجا
معاون العميد للشؤون العلمية والدراسات العليا

Scientific Associate Name:

Date:

The file is checked by:

Nawal

شعبة الجودة والأداء الجامعي

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

الأستاذ الدكتور
عبد الخالق علوان مجيميد
عميد كلية العلوم

Instructor's Name: Prof. Dr. Layla Abdul Rahman Jabur

Course Description: Fourth Stage Chemistry Courses

This course provides a concise overview of the key course characteristics and learning outcomes, enabling the teacher to demonstrate their ability to achieve these outcomes by maximizing the available learning opportunities. The underlying principles and alternative descriptions are essential.

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**
General statements describing what the program or institution intends to achieve.

4. **Program Accreditation**
Does the program have program accreditation? And from which agency?

5. **Other external influences**
Is there a sponsor for the program?

6. Program Structure				
Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	90	90		
College Requirements	Yes			
Department Requirements	Yes			
Summer Training	Nothing			
Other				

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

Ministry of Higher Education and Scientific Research	Educational Institution: .1
Tikrit University/College of Science/Department of Chemistry	Academic Department/Center: .2
	Course Name/Code .3
	Available Attendance Forms .4
First Semester – Second Semester	Semester/Year: .5
	Total Credit Hours .6
	7. Date of Preparation of this Description
	Course Objectives .8
1- Chapter One: This chapter aims to introduce quantum mechanics, what coordinates are and their relationship to atoms and molecules of organic compounds, what operators and functions are, how each function and coordinate has its own operator, what quantum mechanics is, how a particle is obtained in a vacuum and in a box, what happens in it through differential interactions and mathematical matrices, what its theories are, how functions and laws were calculated according to Newton, and then the development of	

the Lagrange and Hamiltonian equations. It also aims to introduce the student to the subject of the black body box and its relationship to quantum theories and the connection of scientists to defining this phenomenon until reaching modern mechanics, which was the focus of the scientist Schrödinger, and the discovery of the wave function through the analysis of light into wave and particle .
-2Chapter Two aims to make the student understand what a photon is, what optical processes are, and what electronic, vibrational, rotational, and electronic interactions and transitions can occur during this radiation. It also aims to calculate frequencies and effective groups mathematically and numerically and interpret them according to the spectral regions specific to these frequencies.

Course outcomes, teaching and learning methods, and assessment - 9
This chapter aims to introduce quantum mechanics, including coordinates and their relationship to atoms and organic molecules, operators and functions, and how each function and coordinate has its own operator. It also covers quantum theories, how functions and laws were calculated according to Newton, and the subsequent development of Lagrange's equation and Hamilton's function. Furthermore, it aims to familiarize students with the concept of the black body box, its relationship to quantum theories, and the role of scientists in defining this phenomenon until the development of modern mechanics, particularly Schrödinger's work on the wave function through the analysis of light into wave and particle components. The chapter also aims to help students understand the photon, optical processes, and the electronic, vibrational, rotational, and electronic interactions and transitions that can occur during this radiation. Finally, it aims to enable students to calculate frequencies and effective groups mathematically and numerically, and to interpret them according to the spectral regions associated with these frequencies.
B - Course-Specific Skills Objectives This will be achieved through the use of an introductory PowerPoint presentation for students. Modern scientific equipment and practical, computer-based skills can also be utilized in scientific and chemical laboratories. .
Teaching and learning methods

1- Using computers and specialized software for modern quantum mechanics, such as Quantum Office, Chausson 9, and Excel, along with hands-on learning through introductions and understanding the aims of quantum mechanics and molecular spectroscopy.
Assessment Methods
Daily Exam -1 Participation in Lectures -2 Monthly Exams -3
C- Affective and Value-Based Objectives - 1Through student participation and interaction with the teacher's explanation of the material - 2Through fluency in writing formulas and solving problems using them - 3In terms of knowing how to find constants using mathematical equations
D- General and transferable skills (other skills related to employability and personal development). D1 - Graduating a cohort equipped with knowledge of laboratory measurements and standards, and leadership skills applicable outside the academic institution.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit / Topic Title	Teaching Method	Assessment Method
1	4	Understand the coordinate systems used in quantum chemistry.	Coordinate Systems in Quantum Chemistry	Lecture and Discussion	Classroom Participation and Assignments
2	4	Explain the concept of operators and eigenvalue equations.	Operators and Eigenvalue Equations	Lecture and Problem Solving	Quizzes and Assignments
3	4	Describe modern quantum chemistry and the particle-in-a-box model.	Modern Quantum Chemistry and the Particle-in-a-Box Model	Lecture and Discussion	Assignments
4	4	Understand differential and integral methods, the photoelectric effect, and the Compton effect.	Differential and Integral Methods, Photoelectric Effect, and Compton Effect	Lecture and Problem Solving	Quizzes
5	4	Explain the principles of classical quantum mechanics.	Introduction to Classical Quantum Mechanics	Lecture	Assignments
6	4	Apply theoretical concepts through solved examples and exercises.	Problem Solving and Chapter Exercises	Tutorial and Discussion	Exercises
7	—	Assess students' understanding of course material.	First Monthly Examination	Examination	Written Exam
8	4	Derive Lagrangian and Hamiltonian equations.	Lagrangian and Hamiltonian Formulations	Lecture and Derivation	Assignments
9	4	Review and deepen understanding of classical quantum mechanics.	Classical Quantum Mechanics	Lecture and Discussion	Quizzes
10	4	Explain wave-particle duality and calculate photon momentum.	Wave–Particle Duality and Photon Momentum	Lecture and Problem Solving	Assignments
11	—	Evaluate students' progress.	Second Monthly Examination	Examination	Written Exam
12	4	Understand and apply Schrödinger's equation.	Schrödinger Equation	Lecture and Problem Solving	Quizzes
13	4	Explain the fundamental postulates of quantum mechanics.	The Seven Postulates of Quantum Mechanics	Lecture and Discussion	Assignments
14	4	Understand Heisenberg's equation and Dirac's mathematical formalism.	Heisenberg Equation and Dirac Formalism	Lecture and Discussion	Quizzes
15	—	Assess overall achievement of learning outcomes.	Final Examination	Examination	Written Exam

11. Infrastructure

1. Required Textbooks

- Prescribed course textbook approved by the department.

2. Main References

- *Quantum Chemistry* by Muslim.
- *Quantum Mechanics* by Al-Hayali.

A. Recommended Books and References

- Scientific journals and relevant academic publications.
- *Quantum Mechanics* by Al-Hayali and Muslim.
- *Molecular Spectroscopy*.
- Spectroscopy lecture notes prepared by the course instructor.
- Relevant online educational resources.

B. Electronic References and Websites

- Online solved problems and exercises in quantum chemistry and quantum mechanics.
- Academic databases and educational websites.

12. Course Development Plan

1. Introduce an additional specialized textbook containing solved problems and worked examples to enhance students' understanding of the course material.
2. Update approximately 25% of the course content annually.
3. Continuously incorporate modern topics that align with current scientific developments and practical applications.
4. Enhance learning resources by integrating recent research findings and digital educational materials.

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

Academic Program and Course Description Guide

2025

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

Scientific Department: .....Chemistry.....

Academic or Professional Program Name: Bachelor of Science in Chemistry.....

Final Certificate Name: **Bachelor Degree**

Academic System: Semester.....

Description Preparation Date: 5 /10/2025

File Completion Date: 14 /2 / 2026

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: 9/10/2025

Signature:

Approval of the Dean

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

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

General statements describing what the program or institution intends to achieve.

4. Program Accreditation

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

5. Other external influences

Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	1	30		essential
College Requirements	yes			
Department Requirements	yes			

Summer Training	nothing			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
		Instrumental analysis	theoretical	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1
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.

Daily and monthly exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Ass.prof	Chemistry	Analysis chemistry			Staff	

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.

Instrumental analysis main book

John wiley&sons

14. Program Development Plan

Study and compare analytical techniques and the results obtained from each technique

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
2023-2024		Insrumental analysis	Basic												

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

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
2023-2024		Insrumental analysis	Basic												

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

Course Description Form

1. Course Name:
Instrumental analysis
2. Course Code:
3. Semester / Year:
Semester
4. Description Preparation Date:
2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30H/2H Per week
7. Course administrator's name (mention all, if more than one name)
Name: Ass.Prof. Sarhan Ali Salman Email: sarhan.ali@tu.edu.iq
8. Course Objectives

Course Objectives	Understand the techniques instrumental analysis..... • Expanding your skill reviewing g references..... • .....

9. Teaching and Learning Strategies	
Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding t lecture	Introduction	Power.po	Short exam
2	2	Understanding lecture	Types of inst.	Power.p Oint	Short exam
3	2	Uderst.lec	Phot.method	Pow.poin	Short.ex
4	2	Underst.lectu	UV-Visibl	Pow.poin	Short.ex
5	2	Underst.lectu	UV-Visibl-2	Pow.poin	Short.exa
6-	2	Underst.lectu	IR	Pow.poin	Short.exam
7-	2	Exam.	Monthly.exam		
8	2	Unders.lectu	A.A.S	Pow.poin	Short.exam
9	2	Unders.lectu.	A.E.S	Pow.poin	Short.exam
10	2	Unders.lectu	F.A.S	Pow.poin	Short.exam
11	2	Unders.lectu	Turbidity	Pow.poin	Short.exam
12	2	Unders.lectu	S.Polarization	Pow.poin	Short.exam
13	2	Unders.lectu	X-Ray	Pow.poin	Short.exam
14	2	Unders.lectu	F.Ingection	Pow.poin	Short.exam
15	2	Examination	Monthly exam		Examination

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)	Jon&welly
Main references (sources)	Instrumental analysis book
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	