Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form For The Academic

University: University of Anbar
College: College of Education for Pure Science
Department: Chemistry
Date Of Form Completion : 1/9/2023

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Date : / /

Signature

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	University of Anbar
2. University Department/Centre	**College of education for pure science- Department of Chemistry**
3. Programme Title	**Education Chemistry Sciences**
4. Title of Final Award	Master and Ph. D. of **Education Chemistry Sciences**
5. Modes of Attendance offered	**Quarterly**
6. Accreditation	**Nothing**
7. Other external influences	**School application - practical graduation research projects**
8. Date of production/revision ofthis specification	**2023/6/10**
9. Aims of the Programme	
1. Achieving the specified standards for the quality of material, human, technical and financial resources.	
2. Providing an efficient administrative staff that knows its duties and powers according to the work structures and regulations, in which the requirements of the job description are fulfilled**.**	

3. Providing a specialized teaching staff who is fluent in using modern techniques and methods in education with good job satisfaction.
4. Preparing academic programs in accordance with international academic standards and providing their knowledge, training and technical requirements.
5. Preparing students with scientific, practical and educational knowledge that meets the needs of the labor market.
6. Paying attention to scientific research in terms of laboratory, research and researcher in order to achieve a distinguished research reputation locally and globally.
7. Research and professional openness to community institutions to meet their needs and aspirations.
8. Evaluate all individuals and processes to ensure quality performance and continuous improvement.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A1. Knowledge and Understanding

A1. Enable the student to acquire theoretical knowledge of chemistry.

A2. Empowering the student how to teach and ways of communicating scientific information to students.

A3. The student's knowledge of the methods of measurement and evaluation and methods of modern teaching methods in chemistry.

A4. The student is acquainted with the educational material by providing it electronically in the virtual classroom. In addition to enabling the student to know the learning theories related to the ages of students for the secondary school stage.

B. Subject-specific kills

B1. Gaining knowledge and enriching the student with the methods of laboratory work.

B2. Orienting the student to the scientific method in solving all scientific problems.

B3. Knowing the objectives and origins of the art of teaching chemistry.

B4. Enabling students to acquire the skills of using virtual classrooms

Teaching and Learning Methods

1. The method of listening and thinking deeply in order to understand the problem to solve it.
2. The method of scientific discussion and meaningful dialogue.
3. Adopting the method of monthly and final exams and submitting weekly reports.

Assessment methods

1. The treatment method using final scores.
2. Random and surprise tests.
3. Teaching tasks in the virtual classroom.

C. Thinking Skills

C1. Adopting the method of dialogue between the student and the professor.
C2. Interest in research projects and preparing organized reports
C3. Adopt the method of discussion. (Performance tests and seminars).
C4. Adopting e-learning to provide an interesting and flexible learning environment.

Teaching and Learning Methods
1. Method of application in research laboratories 2. Adopting the method of constructive dialogue and discussion 3. Adopt the trial-and-error method. 4. The adoption of multimedia in the virtual classes (image, text, audio, video)
Assessment methods
1. Preparation of the seminar (graduation research) 2. Adoption of the grading method as a basis in the evaluation process. 3. Adoption of the test method. 4. Adopting the method of discussions and dialogues between the students and the professor. 5. Create a test task in the virtual classes.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- That the student benefit from his learning and embody this in his personal and professional development. D2- That the student is able to employ the knowledge he receives during the study stage. D3- That the student benefit from theoretical knowledge in employing the teaching profession and mastering it in a concept-based manner. Fundamentals of teaching chemistry. D4 - Skills of modern technologies in communication, documentation and communication.
Teaching and Learning Methods
1. Field visits in laboratories. 2. Scientific application in laboratories. 3. Take advantage of graduation research. 4. Presentation and presentation of educational content in virtual classes using multimedia (video, recorded lecture).
Assessment Methods
1. Articles and periodical research 2. The interview 3. Final exams 4. Determining study tasks and duties periodically and regularly in the virtual classroom

11. Programme Structure (Master)				
Level/ Year	**Course or Module Code**	**Course or ModuleTitle**	**Weekly hours**	
			Lec.	**Lab.**
Attending (First + Second) Class		organic chemistry	**2**	
		Inorganic chemistry	**2**	
		Analytical chemistry	**2**	
		Biochemistry	**2**	
		English	**2**	
		Modern trends in teaching methods	**2**	
		Research techniques	**3**	
		Spectral analysis	**2**	
		Special topic 1	**2**	
		Special topic 2	**2**	
		Discussion panel	**1**	
		Scientific research method	**2**	
		Educational technology and learning theories	**2**	
Research class		**Thesis Project**	**4**	

12. Programme Structure (Ph.D.)				
Level/ Year	**Course or Module Code**	**Course or ModuleTitle**	**Weekly hours**	
			Lec.	**Lab.**
Attending (First + Second) Class		organic chemistry	**2**	
		Inorganic chemistry	**2**	
		Analytical chemistry	**2**	
		Biochemistry	**2**	
		Discussion panel	**1**	
		Teaching methods	**2**	
		Advanced research techniques	**3**	
		Special topic 1	**2**	
		Special topic 2	**2**	
		English	**2**	
		Learning and teaching theories	**2**	
		Scientific research method	**2**	
Research class		**Thesis Project**	**4**	

13. Personal Development Planning
1. Using modern scientific sources. 2. Using rapid communication networks to transfer information such as the Internet. 3. Visits and practical practices in service laboratories. 4. Acquisition of scientific and modern experiences and skills in the field of modern technical communication
14. Admission criteria
1. Admission according to the general and central average system. 2. Admission to departments is according to the student's desire and is modified. 3. It is a condition for a graduate of the preparatory school and the scientific stream exclusively. 4. The accepted student's personal and mental integrity and freedom from physical impairments
15. Key sources of information about the programme
1. Curriculum books approved by the Sectorial Committee of the Faculties of Education for Pure Sciences. 2. Helping books. 3. Books and archaeological resources / sources in the English language. 4. Additional sources from the Internet. 5. The training courses held by the university on e-learning platforms.

Curriculum Skills Map (Master)																			
				Programme Learning Outcomes															
Year / Level	Course Code	CourseTitle	Core (C) or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and TransferableSkills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Attending (First +Second)		organic chemistry	core	√	√	√		√				√	√			√			
		Inorganic chemistry	core	√	√	√		√				√	√			√			
		Analytical chemistry	core	√	√	√		√				√	√			√			
		Biochemistry	core	√	√	√		√				√	√			√			
		English	core	√	√	√		√				√	√			√			
		Modern trends in teaching methods	core	√	√	√		√				√	√			√			
		Research techniques	core	√	√	√		√				√	√			√			
		Spectral analysis	core		√	√		√					√			√		√	
		Special topic 1	core				√			√				√		√		√	
		Special topic 2	core				√			√				√		√		√	
		Discussion panel	core		√						√			√		√			
		Scientific research method	core				√			√				√					
		Educational technology and learning theories	core				√				√			√					
Second Year Researcher		Thesis Project	core		√	√			√								√		

Curriculum Skills Map
(Ph.D.)

Year / Level	Course Code	CourseTitle	Core (C) or Option (O)	Programme Learning Outcomes															
				Knowledge and understanding				Subject-specific skills				Thinking Skills				General and TransferableSkills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Attending (First +Second)		organic chemistry	core	√	√	√		√				√	√			√			
		Inorganic chemistry	core	√	√	√		√				√	√			√			
		Analytical chemistry	core	√	√	√		√				√	√			√			
		Biochemistry	core	√	√	√		√				√	√			√			
		Discussion panel	core	√	√	√		√				√	√			√			
		Teaching methods	core	√	√	√		√				√	√			√			
		Advanced research techniques	core	√	√	√		√				√	√			√			
		Special topic 1	core		√	√		√					√			√		√	
		Special topic 2	core				√			√				√		√		√	
		English	core				√			√				√		√		√	
		Learning and teaching theories	core		√						√			√		√			
		Scientific research method	core				√			√				√					
Second Year Researcher		Thesis Project	core		√	√			√								√		

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	**College of Education for Pure Sciences**
University department/center	**Chemistry/ PhD of Education Chemistry**
Course name/code	**Advanced analytical chemistry**
Programs in which it is included	**Lectures in the graduate hall**
Available attendance forms	**Nothing**
Semester/year	**first / 2023 - 2024**
Number of study hours (total)	**30**
Date this description was prepared	**1/9/2023**

Course objectives:

This course aims to convey a general idea about Advanced analytical chemistry . Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of Polymer analyses reactions over time.

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in Advanced analytical chemistry

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course

B1- The student should devise solutions and explanations for Advanced analytical chemistry phenomena.

B2- The student should design a plan to study Advanced analytical chemistry vocabulary **B3- The student's knowledge of the concept of Advanced analytical chemistry**
Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals ***C1- Accuracy in analysis and decision making*** ***C2- Credibility and transparency in scientific research*** ***C3- Instilling the foundations of the value of Advanced analytical chemistry***
D- General and qualifying transferable skills (other skills related to employability and personal development) **D1- Developing communication skills** **D2- Developing analytical and research skills** **D3- Desire to learn** **D4- Having creative skills and the ability to solve problems**
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level.
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	**direct**	**A general introduction to ways of expressing concentration**	**Develop theoretical skills**	**2**	**Week 1**
Exams and daily activities	**direct**	**Introduction to spectroscopic methods s**	**Develop theoretical skills**	**2**	**Week 2**
Exams and daily activities	**direct**	**Uv-visible spectroscopy**	**Develop theoretical skills**	**2**	**Week 3**
Exams and daily activities	**direct**	**Mathematical laws and devices related to Uv-visible spectroscopy**	**Develop theoretical skills**	**2**	**Week 4**
Exams and daily activities	**direct**	**Infrared spectroscopy**	**Develop theoretical skills**	**2**	**Week 5**
Exams and daily activities	**direct**	**Mathematical laws and devices related to infrared spectroscopy**	**Develop theoretical skills**	**2**	**Week 6**
Exams and daily activities	**direct**	**Introduction to atomic spectroscopy**	**Develop theoretical skills**	**2**	**Week 7**
Exams and daily activities	**direct**	**Atomic absorption spectroscopy**	**Develop theoretical skills**	**2**	**Week 8**
Exams and daily activities	**direct**	**Mathematical laws and devices related to atomic absorption spectroscopy**	**Develop theoretical skills**	**2**	**Week 9**
Exams and daily activities	**direct**	**Atomic emission spectroscopy and inductively coupled plasma**	**Develop theoretical skills**	**2**	**Week 10**
Exams and daily	**direct**	**Mathematical laws and devices related**	**Develop theoretical**	**2**	**Week 11**

activities		**to atomic emission spectroscopy and plasma**	**skills**		
Exams and daily activities	**direct**	**Atomic fluorescence and phosphorescence spectroscopy**	**Develop theoretical skills**	**2**	**Week 12**
Exams and daily activities	**direct**	**Mathematical laws and devices related to fluorescence and atomic phosphorescence spectroscopy**	**Develop theoretical skills**	**2**	**Week 13**
Exams and daily activities	**direct**	**NMR spectroscopy**	**Develop theoretical skills**	**2**	**Week 14**
Exams and daily activities	**direct**	**Mass spectrometry and related devices**	**Develop theoretical skills**	**2**	**Week 15**

Infrastructure	
Required prescribed books	**Instrumental Chemical Analysis, Dr. Abdul Mohsen Al-Haidari,** **Methods Of Instrumental Chemical Analysis , Dr. Fathi Ahmed**
Main references (sources)	**Books and research published by Iraqi universities and reputable international universities**
Recommended books and references (scientific journals, reports,...)	**Modern Analytical Chemistry, David Harvey, DePauw University .**
Electronic references, websites...	**Electronic virtual library, solid references from the Internet**

Judicial development plan
Ensuring the exchange of experiences and visits made by the teaching staff to universities and colleges outside Iraq play a helpful role in formulating curricula to serve the development of the educational process.

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	**College of Education for Pure Sciences**
University department/center	**Chemistry/ PhD of Education Chemistry**
Course name/code	**Research techniques**
Programs in which it is included	**Lectures in the graduate hall**
Available attendance forms	**Nothing**
Semester/year	**second / 2023 - 2024**
Number of study hours (total)	**30**
Date this description was prepared	**1/2/2024**
Course objectives:	
This course aims to convey a general idea about Research techniques . Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of Research techniques reactions over time.	

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in Research techniques

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course **B1- The student should devise solutions and explanations for Research techniques phenomena.** **B2- The student should design a plan to study Research techniques vocabulary** **B3- The student's knowledge of the concept of Research techniques**
Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals ***C1- Accuracy in analysis and decision making*** ***C2- Credibility and transparency in scientific research*** ***C3- Instilling the foundations of the value of Research techniques***
D- General and qualifying transferable skills (other skills related to employability and personal development) **D1- Developing communication skills** **D2- Developing analytical and research skills** **D3- Desire to learn** **D4- Having creative skills and the ability to solve problems**
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level.
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	**direct**	A general introduction to the general concepts of chemistry	**Develop theoretical skills**	**3**	**Week 1**

Exams and daily activities	**direct**	**Introduction to basic laboratory techniques** **s**	**Develop theoretical skills**	**3**	**Week 2**
Exams and daily activities	**direct**	**How to use research tools and equipment**	**Develop theoretical skills**	**3**	**Week 3**
Exams and daily activities	**direct**	**Introduction to separation techniques**	**Develop theoretical skills**	**3**	**Week 4**
Exams and daily activities	**direct**	**Basic separation techniques and related mathematical laws**	**Develop theoretical skills**	**3**	**Week 5**
Exams and daily activities	**direct**	**Introduction to distillation and recrystallization processes**	**Develop theoretical skills**	**3**	**Week 6**
Exams and daily activities	**direct**	**Chemicals and solvents for separation methods and how to prepare them**	**Develop theoretical skills**	**3**	**Week 7**
Exams and daily activities	**direct**	**Introduction to the principles of chromatography**	**Develop theoretical skills**	**3**	**Week 8**
Exams and daily activities	**direct**	**Types of chromatography**	**Develop theoretical skills**	**3**	**Week 9**
Exams and daily activities	**direct**	**Types of phases used in chromatography**	**Develop theoretical skills**	**3**	**Week 10**
Exams and daily activities	**direct**	**Mathematical laws of chromatography**	**Develop theoretical skills**	**3**	**Week 11**
Exams and daily activities	**direct**	**Mechanism of chromatographic methods**	**Develop theoretical skills**	**3**	**Week 12**

Exams and daily activities	**direct**	**Adsorption and ppartition chromatography**	**Develop theoretical skills**	**3**	**Week 13**
Exams and daily activities	**direct**	**Thin layer and column chromatography**	**Develop theoretical skills**	**3**	**Week 14**
Exams and daily activities	**direct**	**Gas chromatography and high-performance**	**Develop theoretical skills**	**2**	**Week 15**

Infrastructure	
Required prescribed books	**Methods of separation - Albertine Habosh** **Methods Of Instrumental Chemical Analysis , Dr. Fathi Ahmed**
Main references (sources)	**Books and research published by Iraqi universities and reputable international universities**
Recommended books and references (scientific journals, reports,...)	**Chromatography,** Basic Principles, Sample Preparations and Related Method**, Elsa Lundanes, Léon Reubsaet and Tyge Greibrokk** **Introduction to Modern Liquid Chromatography,** **Snyder, L.R., Kirkland, J.J., Dolan, J.W., 3rd Edition 2010 .**
Electronic references, websites...	**Electronic virtual library, solid references from the Internet**

Judicial development plan
Ensuring the exchange of experiences and visits made by the teaching staff to universities and colleges outside Iraq play a helpful role in formulating curricula to serve the development of the educational process.

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	**College of Education for Pure Sciences**
University department/center	**Chemistry/ PhD of Education Chemistry**
Course name/code	**Polymer analyses**
Programs in which it is included	**Lectures in the graduate hall**
Available attendance forms	**Nothing**
Semester/year	**Second / 2023 - 2024**
Number of study hours (total)	**30**
Date this description was prepared	**1/2/2024**
Course objectives:	
This course aims to convey a general idea about Polymer analyses . Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of Polymer analyses reactions over time.	

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in Polymer analyses

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course

B1- The student should devise solutions and explanations for Polymer analyses phenomena.

B2- The student should design a plan to study Polymer analyses vocabulary

B3- The student's knowledge of the concept of Polymer analyses

Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals **C1- Accuracy in analysis and decision making** **C2- Credibility and transparency in scientific research** **C3- Instilling the foundations of the value of Polymer analyses**
D- General and qualifying transferable skills (other skills related to employability and personal development) **D1- Developing communication skills** **D2- Developing analytical and research skills** **D3- Desire to learn** **D4- Having creative skills and the ability to solve problems**
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level.
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	**direct**	**General introduction to polymers**	**Develop theoretical skills**	**2**	**Week 1**
Exams and daily activities	**direct**	**Spectroscopic methods for characterizing polymers**	**Develop theoretical skills**	**2**	**Week 2**
Exams and daily activities	**direct**	**Infrared spectrum**	**Develop theoretical skills**	**2**	**Week 3**
Exams and daily activities	**direct**	**NMR spectrum**	**Develop theoretical skills**	**2**	**Week 4**
Exams and daily activities	**direct**	**Electron magnetic resonance spectrum**	**Develop theoretical skills**	**2**	**Week 5**
Exams and daily activities	**direct**	**X-ray analysis**	**Develop theoretical skills**	**2**	**Week 6**
Exams and daily activities	**direct**		**Develop theoretical skills**	**2**	**Week 7**
Exams and daily activities	**direct**	**Using a microscope to analyze polymers**	**Develop theoretical skills**	**2**	**Week 8**
Exams and daily activities	**direct**	**Thermal analysis**	**Develop theoretical skills**	**2**	**Week 9**
Exams and daily activities	**direct**	**DSC**	**Develop theoretical skills**	**2**	**Week 10**
Exams and daily activities	**direct**	**DTA**	**Develop theoretical skills**	**2**	**Week 11**
Exams and daily activities	**direct**	**TGA**	**Develop theoretical skills**	**2**	**Week 12**
Exams and daily activities	**direct**	**TMA**	**Develop theoretical skills**	**2**	**Week 13**
Exams and daily activities	**direct**	**Calorimetric methods of thermal analysis**	**Develop theoretical skills**	**2**	**Week 14**
Exams and daily activities	**direct**	**Mass spectrum**	**Develop theoretical skills**	**2**	**Week 15**

Infrastructure	
Required prescribed books	**-Polymers - Al-Hazazi. 1995 -Polymer technology and chemistry. Author's name: Gorkis Abdel Adam. Country of publication: University of Basra. Publishing House, College of Science. Publication year: 1983**
Main references (sources)	**Books and research published by Iraqi universities and reputable international universities**
Recommended books and references (scientific journals, reports,...)	**D. Rogers, Concise Physical Chemistry, Wiley 2011.**
Electronic references, websites...	**Electronic virtual library, solid references from the Internet**

Judicial development plan
Ensuring the exchange of experiences and visits made by the teaching staff to universities and colleges outside Iraq play a helpful role in formulating curricula to serve the development of the educational process.

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	College of Education for Pure Sciences
University department/center	Chemistry/ PhD of Education Chemistry
Course name/code	Separation methods
Programs in which it is included	Lectures in the graduate hall
Available attendance forms	Nothing
Semester/year	Second / 2023 - 2024
Number of study hours (total)	30
Date this description was prepared	1/2/2024

Course objectives:

This course aims to convey a general idea about Separation methods . Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of Separation methods reactions over time.

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in Separation methods

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course

B1- The student should devise solutions and explanations for Separation methods phenomena.

B2- The student should design a plan to study Separation methods vocabulary

B3- The student's knowledge of the concept of Separation methods

Teaching and learning methods

Whiteboard and Data show

Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals **C**1- Accuracy in analysis and decision making C2- Credibility and transparency in scientific research C3- Instilling the foundations of the value of Separation methods
D- General and qualifying transferable skills (other skills related to employability and personal development) D1- Developing communication skills D2- Developing analytical and research skills D3- Desire to learn D4- Having creative skills and the ability to solve problems
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level**.**
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	direct	Chemical separation methods: general introduction	Develop theoretical skills	2	Week 1
Exams and daily activities	direct	Separation methods by precipitation	Develop theoretical skills	2	Week 2
Exams and daily activities	direct	Separation by acid control	Develop theoretical skills	2	Week 3
Exams and daily activities	direct	Complex ion formation and separation processes by precipitation	Develop theoretical skills	2	Week 4
Exams and daily activities	direct	Separation of trace components	Develop theoretical skills	2	Week 5

Exams and daily activities	direct	Separation methods by distillation	Develop theoretical skills	2	Week 6
Exams and daily activities	direct	Separation by combustion and volatilization	Develop theoretical skills	2	Week 7
Exams and daily activities	direct	Indirect separation techniques	Develop theoretical skills	2	Week 8
Exams and daily activities	direct	Solvent extraction	Develop theoretical skills	2	Week 9
Exams and daily activities	direct	Percentage of extraction	Develop theoretical skills	2	Week 10
Exams and daily activities	direct	Adsorption and adsorption isotherms	Develop theoretical skills	2	Week 11
Exams and daily activities	direct	Distribution and distribution coefficient	Develop theoretical skills	2	Week 12
Exams and daily activities	direct	General principles of chromatography	Develop theoretical skills	2	Week 13
Exams and daily activities	direct	Development of chromatograms	Develop theoretical skills	2	Week 14
Exams and daily activities	direct	Ion exchange	Develop theoretical skills	2	Week 15

Infrastructure	
Required prescribed books	Analytical Chemistry, Part Two, Introduction to Separation Methods, Safaa Razouki Al-Marab.
Main references (sources)	Modern Methods of Chemical Analysis Translated by Dr. Basem Muhammad Saadi, Muqdad Abdustar Mahdi, University of Baghdad, First Edition
Recommended books and references (scientific journals, reports,...)	Modern Methods and Techniques in Automated Chemical Analysis, Jamil Musa Dhabbab, Al-Mustansiriya University, 2013.
Electronic references, websites...	Electronic virtual library, solid references from the Internet

Judicial development plan
Ensuring the exchange of experiences and visits by the teaching staff to universities and colleges outside Iraq plays a supporting role in reformulating curricula to serve the development of the educational process. Developing the curriculum in continuous keeping pace with the development in the academic programs of the corresponding departments in international universities in the nature of the academic subjects that meet the need and the extent to which they cover the requirements of the productive and academic activities of the beneficiary parties. Working to enhance the student's self-confidence by focusing on positive behaviors and effective contributions to build a personality aware of its role in developing society and capable of carrying the scientific and moral trust in their professional lives..

Course description

Organic Synthesis / Ph.D Advanced

This course description provides a succinct summary of the most important course characteristics and the learning outcomes the student is expected to achieve
Demonstrating whether they have made the most of the learning opportunities available. It must be linked to a description the program

College of Education for Pure Sciences / Anbar University	1. Educational institution
Chemistry	2. University department/center
Organic Synthesis / Ph.D Advanced	3. Course name/code
Daily and at the time specified in the schedule	4. Available forms of attendance
Courses - second semester	5. Semester/year
2Theoretical	6. Number of study hours (total)
10/6 2024/	7. Date this description was prepared
8. Course objectives: This course aims to teach the student how to prepare organic compounds	

9. Course outcomes and teaching, learning and evaluation methods
a. Cognitive objectives 1. Enable the student to obtain scientific knowledge in preparing organic compounds 2. Introducing the student to the important basics in preparing organic compounds 3.Introducing the student to chemical methods in preparing organic compounds

a. Course-specific skills objectives 1. The student masters the methods of preparing organic compounds 2. The student must master chemical methods in preparing organic compounds 3. The possibility of preparing unknown organic compounds by chemical methods
Teaching and learning methods
1. Lectures 2. Using educational programs to give the lecture through one program and explain it to students through another program
Evaluation methods
Oral exams (currently replaced by Quiz questions) Monthly exams Quarterly exams
C- Emotional and value goals .1The student's ability to work within the educational and professional work team .2Positive thinking and utilizing the knowledge you have received. .3The ability to deal with parties outside the university and train with them. .4 That the student can learn and master the teaching professio
Teaching and learning methods
.1Lectures .2Display slides .3 The use of laboratory materials and laboratory equipment in organic preparation
Evaluation methods
.1Oral exams .2Monthly exams .3Quarterly exams
D - Transferable general and qualifying skills (other skills related to employability and personal development). .1Adopting the method of dialogue between the student and the professor. .2Preparing organized reports. .3 Adopting the discussion method

Course structure .10

Evaluation method	Teaching method	Name of the unit/course or subject	Required learning outcomes	hours	the week
Weekly and monthly exams	lecture	Organic Reactive Intermedites,Internal transformation of effective aggregates	Chapter One:Organic Reactive Intermedites, Internal transformation of effective groups	2 Theoretical	**1**
Weekly and monthly exams	lecture	Types of carbon searching for electrons	Chapter Two: Formation of carbon-carbon bonds	2 Theoretical	**2**
Weekly and monthly exams	lecture	Nuclei-seeking carbon species	Chapter Two: Formation of carbon-carbon bonds	2 Theoretical	**3**
Weekly and monthly exams	lecture	Close the loop	Chapter Three: Closing the loop and opening the loop	2 Theoretical	**4**
Weekly and monthly exams	lecture	Open the loop	Chapter Three: Closing the loop and opening the loop	2 Theoretical	**5**
Weekly and monthly exams	lecture	Oxidation and reduction	Chapter Four: Oxidation and Reduction	2 Theoretical	**6**
Weekly and monthly exams	lecture	Effective group protection	Chapter Five: Protecting effective groups	2 Theoretical	**7**
Weekly and monthly exams	lecture	Alcohols	Chapter Six: Selections from organic preparation	2 Theoretical	**8**
Weekly and monthly exams	lecture	Ketones	Chapter Six: Selections from organic preparation	2 Theoretical	**9**
Weekly and monthly exams	lecture	Amides	Chapter Six: Selections from organic preparation	2 Theoretical	**10**
Weekly and monthly exams	lecture	Carboxylic acids	Chapter Six: Selections from organic preparation	2 Theoretical	**11**
Weekly and monthly exams	lecture	Beta-hydroxycarbonyl compounds	Chapter Six: Selections from organic preparation	2 Theoretical	**12**
Weekly and monthly exams	lecture	1,3-Dicarbonyl compounds	Chapter Six: Selections from organic preparation	2 Theoretical	**13**
Weekly and monthly exams	lecture	1,5-dicarbonyl compounds	Chapter Six: Selections from organic preparation	2 Theoretical	**14**
Weekly and monthly exams	lecture	Preparing medications	Chapter Six: Selections from organic preparation	2 Theoretical	**15**

.11Infrastructure

Basics of organic preparation	1- Required prescribed books

Organic Synthesis	2- Main references (sources)
Scientific books and journals on organic preparation	Recommended books and references (scientific journals, reports,...)
Organic Synthesis	B - Electronic references, Internet sites...

Course development plan .10
- 1Adding organic preparation methods for various other organic groups -2Adding the preparation of various other medications.

COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Anbar
2. University Department/Centre	College of Education for Pure Sciences / Department of Chemistry
3. Course title/code	Advanced Organic chemistry
4. Programme(s) to which it contributes	Master Degree in chemistry
5. Modes of Attendance offered	Presence
6. Semester/Year	First semester 2023-2024
7. Number of hours tuition (total)	2 hr.
8. Date of production/revision of this specification	12-6-2023
9. Aims of the Course	
-The student learns the principal of advanced organic chemistry	
-Study of pericyclic reactions	
The student learns the mechanisms of pericyclic reactions	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1- Graduate students understand how to solve many advanced pericyclic problems

A2. The student will understand how to solve equations using the matrix

A3. - The student understands how to find the eigen value and the eigen vector

B. Subject-specific skills

1. The ability to analyze and evaluate chemical theories
2. The ability to solve chemical problems based on the available laws.
3. The ability to determine the scientific steps for making decisions
4. The ability to be creative and invent methods using chemical information

Teaching and Learning Methods

-Lecture ,discussion ,and solving of problem.

Assessment methods

-Short question - Activity -Duties – Final exam.

C. Thinking Skills

C1. Ask any questions and home work

Teaching and Learning Methods

-Lecture ,discussion ,and questioning.

Assessment methods

1 monthly exam 20
2 Activity and duties 5
3 Oral exam 5
4 Final exam 70
Total 100%

D. General and Transferable Skills (other skills relevant to employability and personal development) Many problems in advanced chemistry, such as pericyclic mechanisms, effect of substituents on reaction rate and the stereochemistry the products

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	hybridization	Hybridization types	A theoretical explanation on the board with examples Daily exam, discussion, assignments, and monthly exams	A theoretical explanation on the board with examples Daily exam, discussion, assignments, and monthly exams
2	2	Orbitals	Orbitals types	=	=
3	2	Orbital interaction	Linear combination of atomic orbital	=	=
4	2	Aromaticity	Aromaticity and energy calculation	=	=
5	2	conjugation	Conjugation types	=	=
6	2	Huckel rule Bonding	Huckel rules for aromaticity and bonding types	=	=
7	2	fiirst month exam	fiirst month exam	=	=
8	2	Pericyclic	Principal of pericyclic reactions	=	=
9	2	Wave function	Principal of Wave function	=	=
10	2	Electrocyclic reactions	Electrocyclic reactions	=	=
11	2	Stereo of Electrocyclic reactions	Stereochemistry of Electrocyclic reactions	=	=
12	2	Cycloaddition reactions	Cycloaddition reactions	=	=
13	2	Stereo of Cycloaddition reactions	Stereochemistry of Cycloaddition reactions	=	=
14	2	Sigmatropic reactions	Sigmatropic reactions stereo and mechanism	=	=
15	2	Second month	Second month exam		

		exam			

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Advanced organic chemistry by Prof. Dr. Fahas A. H.
Special requirements (include for example workshops, periodicals, IT software, websites)	Gaussian program W09
Community-based facilities (include for example, guest Lectures , internship , field studies)	No

13. Admissions	
Pre-requisites	Bs.c. in chemistry
Minimum number of students	4
Maximum number of students	25

COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Anbar
2. University Department/Centre	College of Education for Pure Sciences / Department of Chemistry
3. Course title/code	Identification of organic compounds
4. Programme(s) to which it contributes	Master Degree in chemistry
5. Modes of Attendance offered	Presence
6. Semester/Year	First semester 2023-2024
7. Number of hours tuition (total)	2 hr.
8. Date of production/revision of this specification	12-6-2023
9. Aims of the Course	
-The student learns the principal of identification of organic compounds	
-Study of FTIR	
-Study of NMR	
-Study of Uv-Vis	
The student learns the mechanisms of instrument work.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

B- Knowledge and Understanding

A1- Graduate students understand electromagnetic region

A2. The student understand FTIR instrument

A3. - The student understands measurements type

A4.- The student understands the mechanism of resonance in NMR

B. Subject-specific skills

4- The student should deduce the mechanism of infrared diagnosis

5- The student should distinguish, through reviewing the spectrum, its type and benefit

6- The student should conclude that the effect of the compensated groups on the spectrum

Teaching and Learning Methods

-Lecture ,discussion ,and solving of problem.

Assessment methods

-Short question - Activity -Duties – Final exam.

C. Thinking Skills

C1. Ask any questions and home work

Teaching and Learning Methods

-Lecture ,discussion ,and questioning.

Assessment methods

1 monthly exam 20
2 Activity and duties 5
3 Oral exam 5
4 Final exam 70
Total 100%

D. General and Transferable Skills (other skills relevant to employability and personal development) Many problems in advanced Identification , such as FTIR chars, effect of substituents on chemical shift and the stereochemistry the compounds

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	FTIR	Infrared spectroscopy	A theoretical explanation on the board with examples Daily exam, discussion, assignments, and monthly exams	A theoretical explanation on the board with examples Daily exam, discussion, assignments, and monthly exams
2	2	Sampling	Sampling of compounds	=	=
3	2	Regions	FTIR regions	=	=
4	2	Chart region	Finger print and functional groups	=	=
5	2	NMR	Resonance mechanism	=	=
6	2	Solvent and TMS	Deuterated solvents and TMS	=	=
7	2	First month exam		=	=
8	2	Chemical shift	Chemical shift and chemical shift reagents	=	=
9	2	Coupling	Coupling types	=	=
10	2	Spinning	Spinning types	=	=
11	2	NMR for aromatic compound	NMR for aromatic compound	=	=
12	2	Uv-Vis	Ultraviolate spectra	=	=
13	2	Sampling	Solvent and sampling	=	=
14	2	Conjugated compound	Spectrum of conjugated compounds	=	=
15	2	Second month exam	Second month exam		

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Organic Identification by Proff.Dr. Abduljabbar A. M.
Special requirements (include for example workshops, periodicals, IT software, websites)	Identification of organic compounds by selverstien
Community-based facilities (include for example, guest Lectures , internship , field studies)	No

13. Admissions	
Pre-requisites	Bs.c. in chemistry
Minimum number of students	4
Maximum number of students	25

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	**College of Education for Pure Sciences**
University department/center	**Chemistry/Master of Education Chemistry**
Course name/code	**physical chemistry**
Programs in which it is included	**Lectures in the graduate hall**
Available attendance forms	**Nothing**
Semester/year	**first/ 2023 - 2024**
Number of study hours (total)	**30**
Date this description was prepared	**1/9/2023**

Course objectives:

This course aims to convey a general idea about physical chemistry. Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of physical chemistry reactions over time.

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in physical chemistry

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course

B1- The student should devise solutions and explanations for physical chemistry phenomena.

B2- The student should design a plan to study physical chemistry vocabulary

B3- The student's knowledge of the concept of physical chemistry

Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals **C1- Accuracy in analysis and decision making** **C2- Credibility and transparency in scientific research** **C3- Instilling the foundations of the value of physical chemistry**
D- General and qualifying transferable skills (other skills related to employability and personal development) **D1- Developing communication skills** **D2- Developing analytical and research skills** **D3- Desire to learn** **D4- Having creative skills and the ability to solve problems**
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level.
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	**direct**	**The concept of kinetic chemistry**	**Develop theoretical skills**	**2**	**Week 1**
Exams and daily activities	**direct**	**How to find the rate of reaction**	**Develop theoretical skills**	**2**	**Week 2**
Exams and daily activities	**direct**	**Factors affecting it**	**Develop theoretical skills**	**2**	**Week 3**

Exams and daily activities	**direct**	**Methods for finding the order of reaction**	**Develop theoretical skills**	**2**	**Week 4**
Exams and daily activities	**direct**	**Methods for finding the reaction rate constant**	**Develop theoretical skills**	**2**	**Week 5**
Exams and daily activities	**direct**	**Zero and first order interaction**	**Develop theoretical skills**	**2**	**Week 6**
Exams and daily activities	**direct**	**Second and third order reactions**	**Develop theoretical skills**	**2**	**Week 7**
Exams and daily activities	**direct**	**Calculate the half-life of all mattresses**	**Develop theoretical skills**	**2**	**Week 8**
Exams and daily activities	**direct**	**The effect of temperature on the reaction rate**	**Develop theoretical skills**	**2**	**Week 9**
Exams and daily activities	**direct**	**The effect of the catalyst on the reaction rate**	**Develop theoretical skills**	**2**	**Week 10**
Exams and daily activities	**direct**	**The effect of ionic strength on the reaction rate**	**Develop theoretical skills**	**2**	**Week 11**
Exams and daily activities	**direct**	**Complex interactions and their types**	**Develop theoretical skills**	**2**	**Week 12**
Exams and daily activities	**direct**	**Kinetics of complex reactions with examples**	**Develop theoretical skills**	**2**	**Week 13**
Exams and daily activities	**direct**	**Interaction theories - collision theory**	**Develop theoretical skills**	**2**	**Week 14**
Exams and daily activities	**direct**	**Active complex theory and monomolecular theory**	**Develop theoretical skills**	**2**	**Week 15**

	Infrastructure
Required prescribed books	**Physical Chemistry, Thomas Engel and Philip Reid, 3rd Edition, Pearson Benjamin Education Inc., 2013, (Chapter 35,36)** **Physical Chemistry, R. Alberty& R. Silby, 2nd ed., 1992, John Wiley and Sons**

	Physical Chemistry, ED3, Andrew Cooksy, chapter13, 14
Main references (sources)	**Al – Nasser; Abdul Majeed "Statistical Reliability", 2009 Rausand; R. " System Reliability theory: Models, Statistical Methods, and Applications"; 2004**
Recommended books and references (scientific journals, reports,...)	**D. Rogers, Concise Physical Chemistry, Wiley 2011.**
Electronic references, websites...	**Electronic virtual library, solid references from the Internet**

Judicial development plan
Ensuring the exchange of experiences and visits made by the teaching staff to universities and colleges outside Iraq play a helpful role in formulating curricula to serve the development of the educational process.

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	**College of Education for Pure Sciences**
University department/center	**Chemistry/Master of Education Chemistry**
Course name/code	**Photochemistry**
Programs in which it is included	**Lectures in the graduate hall**
Available attendance forms	**Nothing**
Semester/year	**Second / 2023 - 2024**
Number of study hours (total)	**30**
Date this description was prepared	**1/2/2024**

Course objectives:

This course aims to convey a general idea about photochemistry. Students are also given some skills that make them familiar with the most important topics that will give them experience in the laboratory process and monitoring the progress of photochemical reactions over time.

Learning outcomes, teaching, learning and assessment methods

1- Cognitive objectives

A1-N Classifies needs for practical development in photochemistry

A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters

A3- To recall the information he studied carefully and verify it practically

B- The skills objectives of the course

B1- The student should devise solutions and explanations for photochemical phenomena.

B2- The student should design a plan to study photochemistry vocabulary

B3- The student's knowledge of the concept of photochemistry

Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals **C1- Accuracy in analysis and decision making** **C2- Credibility and transparency in scientific research** **C3- Instilling the foundations of the value of photochemistry**
D- General and qualifying transferable skills (other skills related to employability and personal development) **D1- Developing communication skills** **D2- Developing analytical and research skills** **D3- Desire to learn** **D4- Having creative skills and the ability to solve problems**
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level.
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure					
Evaluation method	**Teaching method**	**Name of the unit/course or subject**	**Required learning outcomes**	**hours**	**the week**
Exams and daily activities	**direct**	**A general introduction to photochemistry**	**Develop theoretical skills**	**2**	**Week 1**
Exams and daily activities	**direct**	**Laws of photochemistry**	**Develop theoretical skills**	**2**	**Week 2**
Exams and daily activities	**direct**	**Efficiency and quantum yield**	**Develop theoretical skills**	**2**	**Week 3**
Exams and daily activities	**direct**	**Dark reaction and photochemical reaction**	**Develop theoretical skills**	**2**	**Week 4**
Exams and daily activities	**direct**	**Electromagnetic radiationconstant**	**Develop theoretical skills**	**2**	**Week 5**
Exams and daily activities	**direct**	**Potential energy curves**	**Develop theoretical skills**	**2**	**Week 6**
Exams and daily activities	**direct**	**Electronic spectra**	**Develop theoretical skills**	**2**	**Week 7**
Exams and daily activities	**direct**	**Radiological operations**	**Develop theoretical skills**	**2**	**Week 8**
Exams and daily activities	**direct**	**Efficiency and quantum yield**	**Develop theoretical skills**	**2**	**Week 9**
Exams and daily activities	**direct**	**Photosynthesis process in plants**	**Develop theoretical skills**	**2**	**Week 10**
Exams and daily activities	**direct**	**Solar energy conversions and storage**	**Develop theoretical skills**	**2**	**Week 11**
Exams and daily activities	**direct**	**Converting light energy into thermal energy**	**Develop theoretical skills**	**2**	**Week 12**
Exams and daily activities	**direct**	**Fluorescence and phosphorene emission**	**Develop theoretical skills**	**2**	**Week 13**
Exams and daily activities	**direct**	**A general introduction to photochemistry**	**Develop theoretical skills**	**2**	**Week 14**
Exams and daily activities	**direct**	**Importance and applications of photochemistry**	**Develop theoretical skills**	**2**	**Week 15**

Infrastructure	
Required prescribed books	**Principles of photochemistry, Dr. Muhammad Magdy Wasel, Universities Publishing House 2009**
Main references (sources)	**Books and research published by Iraqi universities and reputable international universities**
Recommended books and references (scientific journals, reports,...)	**Introduction to photochemistry, Dr. Laila Al-Hassan, Al-Marikh Publishing House, 1995**
Electronic references, websites...	**Electronic virtual library, solid references from the Internet**

Judicial development plan
Ensuring the exchange of experiences and visits made by the teaching staff to universities and colleges outside Iraq play a helpful role in formulating curricula to serve the development of the educational process.

COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	**university of Anbar/ College of education of pure science**
2. University Department/Centre	chemistry
3. Course title/code	Advanced biochemistry/ CHEM552
4. Programme(s) to which it contributes	Master
5. Modes of Attendance offered	attend two hours every week
6. Semester/Year	courses
7. Number of hours tuition (total)	30 hours (2 hours in week)
8. Date of production/revision of this specification	12/6/2024
9. Aims of the Course	
This course aims to introduce the student to large biomolecules and their metabolic processes.	
The relationship between different metabolic pathways and the energy we need to build a biomolecule is known, and the amount of energy	
Resulting from the process of biodegradation of known biological molecules, and identifying the enzymes that regulate these processes	
The mechanism of action of these enzymes.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1- Graduation of competent teaching staff

A2- Raising the academic level of middle school students

A3- Raising the cultural level of middle school students

A4- Increasing the experiences of teachers and students

A5- A broader understanding of the importance of biological compounds

A6- Understanding the mechanism of action of vital compounds in the body.

B. Subject-specific skills

B1 - Increase knowledge of various vital programs

B2 - Increase knowledge of various computer programs

B3 - Increase knowledge of various statistical programs

B4- Increase knowledge of various vital artificial intelligence programs.

Teaching and Learning Methods

Modern sources are used, including major books and recent research published in peer-reviewed scientific journals within the first quarter of the Scopus or Clarivate index, with an impact factor of no less than ten.

Assessment methods

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

C. Thinking Skills

C1- Encouraging an understanding of the mechanism of action of biological compounds to help reduce the health problems associated with them

C2-Understanding the natural value of these molecules and providing advice to the community about the danger of increasing or decreasing their levels

C3- Dealing positively with the community and holding educational workshops and seminars that contribute to understanding the importance of these compounds.

A4- This work of yours is a service to the nation, religion, and society

Teaching and Learning Methods

modern sources are used, including major books and recent research published in peer-reviewed scientific journals within the first quarter of the Scopus or Clarivate index, with an impact factor of no less than ten.

Assessment methods

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

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1- Developing the teaching language and his societal behaviors
D2- Developing library teaching capabilities in its various forms
D3- Developing the teacher's ability to deal with the pressures of teaching work
D4- Developing the teacher's ability to use modern teaching programs

11. Course Structure

Week	Hours	ILOs	Unit/Module orTopic Title	Teaching Method	Assessment Method
1	2 Theoretical	**Advanced biochemistry**	Energy calculations	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
2	2 Theoretical	**Advanced biochemistry**	High-energy compounds and their biological uses	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
3	2 Theoretical	**Advanced biochemistry**	Krebs cycle	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
4	2 Theoretical	**Advanced biochemistry**	pentose sugar pathway	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
5	2 Theoretical	**Advanced biochemistry**	electron transport chain,	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
6	2 Theoretical	**Advanced biochemistry**	oxidative phosphorylation, and energy calculations	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
7	2 Theoretical	First month exam	first month exam	----------	----------
8	2 Theoretical	**Advanced biochemistry**	Lipids, their classification mechanisms,	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
9	2 Theoretical	**Advanced biochemistry**	biological importance of lipids,	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
10	2 Theoretical	**Advanced biochemistry**	lipid beta oxidation, lipid biosynthesis	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
11	2 Theoretical	**Advanced biochemistry**	cholesterol synthesis, ketone bodies, and energy calculations	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
12	2 Theoretical	**Advanced biochemistry**	Proteins and classification mechanisms, the biological importance of proteins, amino acid metabolism,	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams

13	2 Theoretical	**Advanced biochemistry**	Urea metabolism, creatine and creatinine metabolism, and the relationship between amino acid metabolic pathway	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
14	2 Theoretical	**Advanced biochemistry**	Nucleic acids, their classification mechanisms, and the biological importance of nucleic acids	A theoretical explanation on the board with examples	Daily exam, discussion, assignments, and monthly exams
15	2 Theoretical	First month exam	First month exam	----------	----------

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- Leininger's Principles of Biochemistry, written by David L. Nelson 2- Biochemistry: Concepts and Connections, written by Dean Appling 3- Clinical Chemistry: Principles, Techniques and Relationships by Michael L. Bishop
Special requirements (include for example workshops, periodicals, IT software, websites)	□ Leininger’s principles of biochemistry. □ Biochemistry book with clinical correlations. □ Marx's basic medical biochemistry. □ Color Atlas of Biochemistry.
Community-based facilities (include for example, guest Lectures , internship , field studies)	Molecular cancer. ϧ Annual Review of Biochemistry. ϧ Signal transduction and targeted therapy. ← Molecular cell. ϧ Trends in microbiology. ϧ Nucleic acid research. - Molecular biology and evolution. ϧ Advances in lipid research

13. Admissions	
Pre-requisites	The student’s grade point average for bachelor’s studies is (70□) and the competitive exam (30□). The applicant must also pass the Arabic, English, and computer language tests.
Minimum number of students	Eight students
Maximum number of students	Twenty students

Course description Sample

Reviewing the performance of higher education institutions ((academic program review))

Educational institution	College of Education for Pure Sciences
University department/center	Chemistry / Master of Education Chemistry
Course name/code	Analytical Chemistry
Programs in which it is included	Lectures in the graduate hall
Available attendance forms	Nothing
Semester/year	Second / 2023 - 2024
Number of study hours (total)	30
Date this description was prepared	1/2/2024
Course objectives:	
.1The student understands the principles of analytical chemistry. .2Identify the different methods of expressing concentration in analytical chemistry. .3The student knows the importance of studying the devices related to chemical analysis. 4. The student identifies the names of spectroscopic devices and how they work	

Learning outcomes, teaching, learning and assessment methods
1- Cognitive objectives A1-N Classifies needs for practical development in analytical chemistry A2- To get used to practicing what he has learned of the rules of interpreting the daily phenomena that he encounters A3- To recall the information he studied carefully and verify it practically
B- The skills objectives of the course B1- The student should devise solutions and explanations for analytical chemistry phenomena. B2- The student should design a plan to study analytical chemistry vocabulary B3- The student's knowledge of the concept of analytical chemistry

Teaching and learning methods
Whiteboard and Data show
Evaluation methods
Exams, reports and weekly discussions
C- Emotional and value goals **C**1- Accuracy in analysis and decision making C2- Credibility and transparency in scientific research C3- Instilling the foundations of the value of analytical chemistry
D- General and qualifying transferable skills (other skills related to employability and personal development) D1- Developing communication skills D2- Developing analytical and research skills D3- Desire to learn D4- Having creative skills and the ability to solve problems
Teaching and learning methods
Introducing elective courses to develop higher learning skills, such as critical thinking, creative thinking, systems analysis and design, and philosophy of science, as university requirements and official courses at the graduate level**.**
Evaluation methods
Through the processes of criticism, issuing opinions, rulings, and renewal

Course structure

Evaluation method	Teaching method	Name of the unit/course or subject	Required learning outcomes	hours	the week
Exams and daily activities	direct	The nature of analytical chemistry	Develop theoretical skills	2	Week 1
Exams and daily activities	direct	Methods of expressing concentration	Develop theoretical skills	2	Week 2

Exams and daily activities	direct	Calculating the acidity function of solutions	Develop theoretical skills	2	Week 3
Exams and daily activities	direct	Chemical equilibrium	Develop theoretical skills	2	Week 4
Exams and daily activities	direct	Buffered solutions and related calculations	Develop theoretical skills	2	Week 5
Exams and daily activities	direct	Electromagnetic radiation and its interaction with matter The energy of electromagnetic radiation	Develop theoretical skills	2	Week 6
Exams and daily activities	direct	Quantum laws of absorption	Develop theoretical skills	2	Week 7
Exams and daily activities	direct	Application of the Pierre-Lambert law to multicomponent systems	Develop theoretical skills	2	Week 8
Exams and daily activities	direct	Spectrometry devices	Develop theoretical skills	2	Week 9
Exams and daily activities	direct	Absorption measurements in the Vis, UV region	Develop theoretical skills	2	Week 10
Exams and daily activities	direct	Theory of absorption of infrared radiation	Develop theoretical skills	2	Week 11
Exams and daily activities	direct	Atomic absorption	Develop theoretical skills	2	Week 12
Exams and daily activities	direct	Atomic emission	Develop theoretical skills	2	Week 13
Exams and daily activities	direct	Electrochemical cell	Develop theoretical skills	2	Week 14
Exams and daily activities	direct	Potentiometer Analytical uses of potentiometric measurements	Develop theoretical skills	2	Week 15

Infrastructure	
Required prescribed books	"Fundamental of Analytical Chemistry" by Doglas A. Skooge, Donald M. West and James Holler, 9 Edition, 2013. "Analytical Chemistry" by Gary D. Christian, John Wiley and Sons, Inc. 6th Edition, 2004.
Main references (sources)	Analytical Chemistry - Fundamentals of Analytical Chemistry- Douglas A. Skoog- 8 edition – USA
Recommended books and references (scientific journals, reports,...)	Analytical Chemistry" by Gary D. Christian, Purnendu K. (Sandy) Dasgupta, Kevin A. Schug, 7th Edition, 2014.
Electronic references, websites...	Electronic virtual library, solid references from the Internet

Judicial development plan
Ensuring the exchange of experiences and visits by the teaching staff to universities and colleges outside Iraq plays a supporting role in reformulating curricula to serve the development of the educational process. Developing the curriculum in continuous keeping pace with the development in the academic programs of the corresponding departments in international universities in the nature of the academic subjects that meet the need and the extent to which they cover the requirements of the productive and academic activities of the beneficiary parties. Working to enhance the student's self-confidence by focusing on positive behaviors and effective contributions to build a personality aware of its role in developing society and capable of carrying the scientific and moral trust in their professional lives..

Course description

Stereochemistry / Master

This course description provides a succinct summary of the most important course characteristics and the learning outcomes the student is expected to achieve
Demonstrating whether they have made the most of the learning opportunities available. It must be linked to a description the program

College of Education for Pure Sciences / Anbar University	Educational institution .11
Chemistry	University department/center .12
Stereochemistry / Master	Course name/code .13
Daily and at the time specified in the schedule	Available forms of attendance .14
Courses - second semester	Semester/year .15
2Theoretical	Number of study hours (total) .16
10/6 2024/	Date this description was prepared .17
Course objectives: This course aims to study organic compounds from the stereoscopic aspect .18	

Course outcomes and teaching, learning and evaluation methods.19

A. Cognitive objectives .Teaching students to understand the mechanics of organic reactions in vacuum1. .2.Understanding organic reactions and how they occur or do not occur due to their spatial arrangement. .3.Study of organic compounds vacuum
B. Course-specific skills objectives 1.Teaching the student about the practical chemical methods used in preparing organic compounds vacuum 2.Teaching the student how organic reactions occur in a vacuum 3.Teaching the student how to control the mechanics of organic reactions in a vacuum".
Teaching and learning methods
1. Lectures 2. Using educational programs to give the lecture through one program and explain it to students through another program
Evaluation methods
Oral exams (currently replaced by Quiz questions) Monthly exams Quarterly exams
C- Emotional and value goals .1The student's ability to work within the educational and professional work team .2Positive thinking and utilizing the knowledge you have received. .3The ability to deal with parties outside the university and train with them. .4 That the student can learn and master the teaching professio
Teaching and learning methods
.1Lectures .2Display slides .3 The use of laboratory materials and laboratory equipment in Organic reactions in vacuum
Evaluation methods
.1Oral exams .2Monthly exams .3Quarterly exams
D - Transferable general and qualifying skills (other skills related to employability and personal development). .1Adopting the method of dialogue between the student and the professor. .2Preparing organized reports. .3 Adopting the discussion method

Course structure .20

Evaluation method	Teaching method	Name of the unit/course or subject	Required learning outcomes	hours	the week
Weekly and monthly exams	lecture	Introduction, stereoisomers, optical activity	Chapter One: Basics of stereochemistry	2 Theoretical	**1**
Weekly and monthly exams	lecture	Polarity, specific rotation, chiral carbon atom	Chapter One: Basics of stereochemistry	2 Theoretical	**2**
Weekly and monthly exams	lecture	Photochromic antibodies, photochromic antibodies	Chapter One: Basics of stereochemistry	2 Theoretical	**3**
Weekly and monthly exams	lecture	Racemic forms, meso compounds	Chapter One: Basics of stereochemistry	2 Theoretical	**4**
Weekly and monthly exams	lecture	Stereodistribution system for isomers, semi-chiral carbon atom	Chapter One: Basics of stereochemistry	2 Theoretical	**5**
Weekly and monthly exams	lecture	Intermolecular interactions with stereospecificity	Chapter Two: Preparation and reactions of stereoisomers	2 Theoretical	**6**
Weekly and monthly exams	lecture	Interactions of chiral molecules, relative activity of antibodies	Chapter Two: Preparation and reactions of stereoisomers	2 Theoretical	**7**
Weekly and monthly exams	lecture	Ionic elimination, transformation of geometric problems	Chapter Two: Preparation and reactions of stereoisomers	2 Theoretical	**8**
Weekly and monthly exams	lecture	Stereochemistry of olefin addition reactions	Chapter Two: Preparation and reactions of stereoisomers	2 Theoretical	**9**
Weekly and monthly exams	lecture	Adding Kmno4 and Br2 to the double bond, preparing organic compounds using stereoselectivity	Chapter Two: Preparation and reactions of stereoisomers	2 Theoretical	**10**
Weekly and monthly exams	lecture	Stereochemistry of cyclopropane	Chapter Three: Stereochemistry of aliphatic cyclic compounds	2 Theoretical	**11**
Weekly and monthly exams	lecture	Stereochemistry of cyclobutane	Chapter Three: Stereochemistry of aliphatic cyclic compounds	2 Theoretical	**12**
Weekly and monthly exams	lecture	The stereochemistry of cyclopentane, the stereochemistry of cyclohexane	Chapter Three: Stereochemistry of aliphatic cyclic compounds	2 Theoretical	**13**

Weekly and monthly exams	lecture	Positions of substituted cyclohexane and its relationship to chemical properties	Chapter Three: Stereochemistry of aliphatic cyclic compounds	2 Theoretical	**14**
Weekly and monthly exams	lecture	Stereochemistry of systems with fused rings, stereochemistry of some heterogeneous rings	Chapter Three: Stereochemistry of aliphatic cyclic compounds	2 Theoretical	**15**

.11Infrastructure

Basics of organic preparation	1- Required prescribed books
Stereochemistry	2- Main references (sources)
Scientific books and journals on stereochemistry	Recommended books and references (scientific journals, reports,...)
Stereochemistry	B - Electronic references, Internet sites...

Course development plan .11

- 1Adding stereochemical reactions to various other organic groups
- 2Study the relationship of chemical reactions to vacuum conditions more broadly