



Academic Program Description Form



University Name: Tikrit University

Faculty/Institute: College of Education for Girls

Scientific Department: Department of Chemistry

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

Final Certificate Name: Bachelor's degree in Chemistry

Academic System: Annual/Courses

Description Preparation Date: 18/9/2025

File Completion Date: 18/9/2025

Signature:

Department Head's Name

Dr. Ban Dawood Saleh

Date:

Signature:

Scientific Assistant's Name:

Dr. Ashraf Gamal Mahmoud

Date:

Review the file by: م. شهد خالده حميد

Quality Assurance and University Performance Department

Name of the Director of the Quality Assurance and University Performance:

Department:

Date: 7/10/2025

Signature:

Approval of the Dean

أ.د. نبيل عبد الحليم الجبوري
عميد كلية التربية للبنات

1. Program Vision

- 1- Leadership and innovation in the field of conducting scientific experiments.
- 2- Elevating the level of the laboratory according to the needs of the students.
- 3- Equipping students with the theoretical and applied foundations and information in the field of chemistry and making them competent and capable of offering their expertise to serve the community.

2. Program Mission

- 1- Providing academic education and practical training in the field of scientific laboratories and equipping students with practical skills in line with international standards.
- 2- Elevating the level of the department according to the needs of the students.
- 3- Preparing a conscious generation of students who possess scientific and practical experience in the field of chemistry.
- 4- Training and preparing students on how to avoid risks to ensure chemical safety and security within the laboratory.

3. Program Objectives

- 1- Qualifying students technically and academically in the practical field and applications of chemistry laboratories.
- 2- Preparing students and establishing the foundations of chemistry for them.
- 3- Opening future prospects and attracting students towards the scientific and practical aspects in a better way.
- 4- Guiding students towards engaging with environmental problems around them and finding solutions to serve the community.
- 5- Playing an active and influential role in the fields of analysis and quality control.
- 6- Preparing a generation of qualified and competent teachers to join the education sector.

4. Program Accreditation

Is the program accredited? From which authority? No.

5. Other external influences

The School Application - Laboratory Practical Training
Theoretical and Practical Graduation Research Projects

6.Program Structure				
Program Structure	Number of Courses	A study unit	Percentage	Notes
Enterprise Requirements	nothing			
College Requirements	nothing			
Department Requirements	40	180	10% first stage rate 20% second stage rate 30% third stage rate 40% stage four rate	
Summer Training	nothing			
Others	Watching and applying female students in schools			

* Can include notes on whether the course is required or elective.

7.Program Description				
The year / level	Course code or course title	Course name or subject	Approved hours	
The first/preliminary stage	nothing	Organic chemistry	2	3
The first/preliminary stage	nothing	Analytical chemistry	2	3
The first/preliminary stage	nothing	mathematics	1	-
The first/preliminary stage	nothing	Security and safety	1	-
The first/preliminary stage	nothing	Life sciences	1	2
The first/preliminary stage	nothing	Calculators	1	-
The first/preliminary stage	nothing	Human rights	1	-
The first/preliminary stage	nothing	Arabic	1	-
The first/preliminary stage	nothing	English language	1	-
The first/preliminary stage	nothing	Inorganic chemistry	2	-
The first/preliminary stage	nothing	Developmental and educational psychology	2	-
The first/preliminary stage	nothing	Fundamentals of education	1	-
The second/initial stage	nothing	Organic chemistry	2	3
The second/initial stage	nothing	Inorganic chemistry	2	3
The second/initial stage	nothing	Developmental psychology	2	-
The second/initial stage	nothing	Physical chemistry	2	3
The second/initial stage	nothing	Analytical chemistry	2	3
The second/initial stage	nothing	Calculators	1	2
The second/initial stage	nothing	Educational administration	2	-
The second/initial stage	nothing	mathematics	2	-

The second/initial stage	nothing	English language	1	-
The third/initial stage	nothing	Organic chemistry	2	3
The third/initial stage	nothing	Coordination chemistry	2	3
The third/initial stage	nothing	Physical chemistry	2	3
The third/initial stage	nothing	Biochemistry	2	3
The third/initial stage	nothing	Research methodology	2	-
The third/initial stage	nothing	Teaching methods	2	-
The third/initial stage	nothing	optional	2	-
The third/initial stage	nothing	Industrial chemistry	2	-
The third/initial stage	nothing	Educational guidance	2	-
The third/initial stage	nothing	English language	1	-
The fourth/initial stage	nothing	Biochemistry	2	3
The fourth/initial stage	nothing	Practical education (watch and apply)	2	-
The fourth/initial stage	nothing	Measurement and evaluation	2	-
The fourth/initial stage	nothing	Diagnosis	2	3
The fourth/initial stage	nothing	optional	2	-
The fourth/initial stage	nothing	Automated analysis	2	3
The fourth/initial stage	nothing	Quantum chemistry	2	-
The fourth/initial stage	nothing	English language	1	-
The fourth/initial stage	nothing	Industrial chemistry	2	3

8.Expected learning outcomes of the program

Knowledge

1 Learning Outcomes

Cognitive Objectives

- 1- Empowering students to acquire knowledge and overall intellectual understanding of chemistry.
- 2- Empowering students to acquire knowledge and understanding of the laws of chemistry.
- 3- Empowering students to acquire knowledge and understanding of chemistry in English.
- 4- Empowering students to acquire knowledge and understanding of chemical analysis standards.

1 Learning Outcomes Statement

- 1- Empowering students to acquire knowledge of the basic principles of chemistry.
- 2- Providing students with knowledge through homework assignments of study vocabulary.

Skills

2 Learning Outcomes

General Skills:

- 1- Communication and Information Technology skills and developing strategies for teamwork.
- 2- Proficiency in modern communication techniques, documentation, and communication with institutions and scientific centers.

2-Statement of Learning Outcomes
Empowering students to solve problems that are relevant to their learning style in the lesson.

3- Possessing language skills (fluency in speaking, writing, and understanding Arabic and English) in the art of listening, persuasion, and dialogue. 4- Problem-solving skills in education using educational and psychological programs and methods. 5- Possessing leadership qualities, memory power, intuitive speed, and the ability to predict and infer					
3- Learning Outcomes Skills Objectives: 1 - Scientific and practical skills. 2 - Remembering and analytical skills. 3 - Utilization and development skills.		3- Statement of Learning Outcomes Empowering students to solve problems related to teaching steps and employ the appropriate method.			
The values					
Learning outcomes 4/ Daily and monthly exams		Learning outcomes statement 4/ Final exams			
Learning outcomes 5/ Competitive grades for daily participation in the lesson		Learning outcomes statement 5/ Attendance and regularity grades in lectures			
9. Teaching and Learning Strategies					
Providing students with the basics and topics related to knowledge and systems explained in: 1- Clarifying and explaining the study materials by the academic staff through the whiteboard and Data Show. 2- Providing students with knowledge through homework for study vocabulary. 3- Encouraging students to visit the library to obtain academic knowledge related to study vocabulary. 4- Improving students' skills by visiting electronic sites to obtain additional knowledge for study materials.					
10. Evaluation methods					
1- Daily tests with multiple-choice questions for academic subjects. 2- Grades are assigned for challenging competitive questions for students. 3- Grades are assigned for assigned homework. 4- Quality and quantity practical tests in laboratories. 5- Assigning students to conduct scientific seminars and discuss them.					
11. Faculty					
Faculty Members					
Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Prof	Organic chemistry	Organic chemistry	.	2	
Prof	Analytical chemistry	Analytical chemistry		1	
Prof	Biochemistry	Biochemistry		2	
assistant professor	Physical chemistry	Physical chemistry		2	

assistant professor	Organic chemistry	Organic chemistry		4	
Doctor teacher	Inorganic chemistry	Inorganic chemistry		1	
Doctor teacher	Analytical chemistry	Analytical chemistry		1	
Doctor teacher	Biochemistry	Biochemistry		1	
Teacher	Teaching methods	Teaching methods		1	
Teacher	Calculators	Calculators		1	
Assistant teacher	Analytical chemistry	Analytical chemistry		1	
Assistant teacher	Inorganic chemistry	Inorganic chemistry		1	
Assistant teacher	Organic chemistry	Organic chemistry		3	
Assistant teacher	law	law		1	

12. Acceptance Criterion

- 1- Acceptance based on the overall and central grade system.
- 2- Acceptance in departments based on student's preference and grade.
- 3- Condition that the student must be a graduate of preparatory study and scientific branch only.
- 4- The accepted student must have sound personal and mental health and be free from physical disabilities.
- 5- The capacity of the college's departments to accommodate students.

13. The most important sources of information about the program

- 1- The curriculum approved by the Ministry of Higher Education and Scientific Research and its guiding references.
- 2- Courses and recommendations from scientific committees at the university.
- 3- Courses in teaching methods.
- 4- Training courses organized by the college on e-learning platforms.

Program skills outline

- 5- Internet research for similar experiments.
- 6- Personal experiences.

14. Program Development Plan

- 1- Development of the curriculum through deletion, addition, and replacement.
- 2- Use of modern teaching methods according to the nature of the subject and the level of learners from time to time.
- 3- Use of modern evaluation methods such as alternative and electronic assessment.

[illegible]

		optional	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Industrial chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Educational guidance	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		English language	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
Fourth		Biochemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Practical education (watch and apply)	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Measurement and evaluation	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Diagnosis	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		optional	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Automated analysis	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Quantum chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		English language	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Industrial chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*

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

Course Description Form

1. Course Name:	
Inorganic chemistry / 1 st year	
2. Course Code:	
3. Semester / Year:	
Annual / 2024-2025	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes (Google Classroom), which will be a supporting class for the in-person class, and according to the conditions and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
180 hours per year / 4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Assistant lecturer Noor Abdul Salam Mohammed	
Email: nmohammed@tu.edu.iq	
8. Course objectives	
Course objectives	- Providing students with knowledge of the principles of Atomic construction in Organic chemistry. - Developing students' ability by knowing the most important scientific concepts and rules that must be followed to understand the mechanisms of chemical reactions and how to control them. - Teaching students how to use and apply laws in the practical aspect. - Preparing students to practice the career of teaching chemistry in the academic institutions.
9. Teaching and Learning Strategies	
Strategy	1- Standard method (lectures). 2- Discussion and Questioning method. 3- practical method.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Nov. 3	4		The electronic structure of the atom, the nature of electromagnetic radiation. - Black body radiation, photoelectric effect, atomic spectra	Standard and practical method	Class performance and exams
Nov. 4	4		- Bohr's theorem, improved Bohr's theorem, Heisenberg's rule and the indeterminacy principle.	Standard and practical method	Class performance and exams
Des. 1	4		quantum numbers and energy levels.	Standard and practical method	Class performance and exams
Des. 2	4		Term symbols for atoms and ions in their steady state.	Standard and practical method	Class performance and exams
Des. 3	4		Periodic Table	Standard and practical method	Class performance and exams
Des. 4	4		Periodic properties of atoms - Blocking, atomic and ionic radii	Standard and practical method	Class performance and exams
Jan. 1	4		Tien energy, electron affinity, electronegativity	Standard and practical method	Class performance and exams
Jan. 2	4		Types of bonds and their nature - Ionic, covalent, harmonic, hydrogen, metallic, and Vander Waals forces.	Standard and practical method	Class performance and exams
Jan. 3	4		The structure of the crystal lattice.	Standard and practical method	Class performance and exams
Jan. 4	4		Diatomic molecules	Standard and practical method	Class performance and exams
Feb. 1	4		Equivalence squeeze theorem.	Standard and practical method	Class performance and exams
Feb. 2	4		Molecular Orbital Theory.	Standard and practical method	Class performance and exams
Feb. 3	4		Linear triatomic molecules	Standard and practical method	Class performance and exams
Feb.4	4		Molecules with a planar triangular shape	Standard and practical method	Class performance and exams
Mar. 1	6		Tetrahedral molecules, triangular pyramid molecules.	Standard and practical method	Class performance and exams
Mar. 2	6		Tetrahedral molecules, triangular pyramid molecules.	Standard and practical method	Class performance and exams
Mar/ 3	Spring holiday				
Mar. 4					

Apr. 1	6		angular triatomic molecules.	Standard and practical method	Class performance and exams
Apr. 2	6		angular triatomic molecules.	Standard and practical method	Class performance and exams
Apr. 3	6		Hybridization	Standard and practical method	Class performance and exams
Apr. 4	6		Hybridization	Standard and practical method	Class performance and exams
May. 1	6		Hybridization	Standard and practical method	Class performance and exams
May. 2	6		ionization in some organic molecules	Standard and practical method	Class performance and exams
May.3	6		ionization in some organic molecules	Standard and practical method	Class performance and exams
May. 4	6		ionization in some organic molecules	Standard and practical method	Class performance and exams
Jon 1	6		General Review	Standard and practical method	Class performance and exams

11. Course Evaluation

- 1- Formative evaluation through daily exams, observing the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 20% of the total.
- 2- Diagnostic evaluation by semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) semester exams during the year, that is, two exams for each semester, to extract the annual quest before entering the final exams.

12. Learning and Teaching Resources

Required textbooks	'Inorganic Chemistry'' Book S1 Dr. Bassem Saadi - Inorganic Chemistry S1 Dr. Noman Al-Nuaimi and his group
Main references (sources)	
Recommended books and references (scientific journals, reports ...)	Access to everything that is current and published in peer-reviewed scientific journals
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name:	
Organic Chemistry / first Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. MOHAMMED GAZEE ABED ALKAREEM Email: mgchemo@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	General properties of alkanes	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Synthese of alkanes	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Reactions of alkanes	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	General properties of alkenes	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Synthese of alkenes	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Reactions of alkenes	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	General properties of alkynes	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	Synthese of alkynes	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Reactions of alkynes	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	General properties of alcohol	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Synthese of alcohol	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Reactions of alcohol	Standard method, practical method	Grades and exams
January 1	2	Presentation method Discussion method	Exam 1	Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	General properties of halide alkyl	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Synthese of halide alkyl	Standard method, practical method	Grades and exams
January 4			Reactions of halide alkyl		
February 1	2	Presentation method Discussion method	General properties of alkanes	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Synthese of alkanes	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method	Reactions of alkanes	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	Exam 2	Standard method, practical method	Grades and exams

March 3	2	Presentation method Discussion method	General properties of alkanes	Standard method, practical method	Grades and exams
March 4	2	Presentation method Discussion method	Synthese of alkanes	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	Reactions of alkanes	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Exam 3	Standard method, practical method	Grades and exams
April 3	2	Presentation method Discussion method	General properties of amines	Standard method, practical method	Grades and exams
April 4	2	Presentation method Discussion method	Synthese of amines	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	Reactions of amines	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Aromatic compounds	Standard method, practical method	Grades and exams
May 3			Exam 4		
May 4			General review	Problem-solving method	
May 15					

11. Course Evaluation	
Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.	
12. Learning and Teaching Resources	
Required textbooks (methodology if available)	Foundations of organic chemistry
Main references (sources)	Morisson and boyd
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course Description Form

1. Course Name:	
Analytical chemistry / 1 st year	
2. Course Code:	
3. Semester / Year:	
Annual / 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes (Google Classroom), which will be a supporting class for the in-person class, and according to the conditions and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
120 hours per year / 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecture Dr. Marwan Thaer Jalal	
Email: marwan.analytical@tu.edu.iq	
8. Course objectives	
Course objectives	- Providing students with knowledge of the principles of analytical chemistry one of the basic branches of chemistry. - Developing students' ability by knowing the most important scientific concepts and rules that must be followed to understand the mechanisms of chemical reactions and how to control them. - Teaching students how to use and apply laws in the practical aspect. - Preparing students to practice the career of teaching chemistry in the academic institutions.
9. Teaching and Learning Strategies	
Strategy	1. Standard method (lectures). 2. Discussion and Questioning method. 3. practical method.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Sep. 3	6	Elocution and Discussion Methods	Introduction of Analytical chemistry	Standard and practical method	Class performance and exams
Sep. 4	6	Elocution and Discussion Methods	Introduction of Qualitative, Quantitative and Separation methods	Standard and practical method	Class performance and exams
Oct. 1	6	Elocution and Discussion Methods	Review of elementary concepts	Standard and practical method	Class performance and exams
Oct. 2	6	Elocution and Discussion Methods	The chemical composition of solution, strong and weak electrolytes	Standard and practical method	Class performance and exams
Oct. 3	6	Elocution and Discussion Methods	The dissociation of water	Standard and practical method	Class performance and exams
Oct. 4	6	Elocution and Discussion Methods	Acids and bases	Standard and practical method	Class performance and exams
Nov. 1	6	Elocution and Discussion Methods	Important weight and concentration terms, unit of weight, methods for expression of concentration	Standard and practical method	Class performance and exams
Nov. 2	6	Elocution and Discussion Methods	Stoichiometric relationships	Standard and practical method	Class performance and exams
Nov. 3	6	Elocution and Discussion Methods	Chemical equilibrium	Standard and practical method	Class performance and exams
Nov. 4	6	Elocution and Discussion Methods	The scope of analytical chemistry	Standard and practical method	Class performance and exams
Des. 1	6	Elocution and Discussion Methods	The importance of analytical chemistry	Standard and practical method	Class performance and exams
Des. 2	6	Elocution and Discussion Methods	Classification of methods	Standard and practical method	Class performance and exams
Des. 3	6	Elocution and Discussion Methods	Quantitative analysis	Standard and practical method	Class performance and exams

Des.4	6	Elocution and Discussion Methods	Steps in the determination	Standard and practical method	Class performance and exams
Jan. 1	6	Elocution and Discussion Methods	Concentration	Standard and practical method	Class performance and exams
Jan. 2	6	Elocution and Discussion Methods	Acid base equilibria pH calculations	Standard and practical method	Class performance and exams
Jan/ 3	Spring holiday				
Jan. 4					
Feb. 1	6	Elocution and Discussion Methods	Buffer solution, preparation and mixture	Standard and practical method	Class performance and exams
Feb. 2	6	Elocution and Discussion Methods	An introduction to volumetric methods of analysis	Standard and practical method	Class performance and exams
Feb. 3	6	Elocution and Discussion Methods	Reaction types of volumetric analysis	Standard and practical method	Class performance and exams
Feb. 4	6	Elocution and Discussion Methods	Standard solution and primary solution	Standard and practical method	Class performance and exams
Mar. 1	6	Elocution and Discussion Methods	Volumetric calculations and end point	Standard and practical method	Class performance and exams
Mar. 2	6	Elocution and Discussion Methods	Precipitation titrations	Standard and practical method	Class performance and exams
Mar.3	6	Elocution and Discussion Methods	Titration Curve	Standard and practical method	Class performance and exams
Mar. 4	6	Elocution and Discussion Methods	Theory of neutralization titration of simple systems	Standard and practical method	Class performance and exams
Apr. 1	6	Elocution and Discussion Methods	Theory of neutralization titration of complex systems	Standard and practical method	Class performance and exams
Apr. 2	6	Elocution and Discussion Methods	Volumetric methods based on complex formation methods	Standard and practical method	Class performance and exams
Apr. 3	6	Elocution and Discussion Methods	Equilibrium in oxidation – reduction systems	Standard and practical method	Class performance and exams
Apr. 4	6	Elocution and Discussion Methods	An introduction to volumetric methods of analysis	Standard and practical method	Class performance and exams

May 1	6	Elocution and Discussion Methods	Reaction types of volumetric analysis	Standard and practical method	Class performance and exams
May 2	6	Elocution and Discussion Methods	Standard solution and primary solution	Standard and practical method	Class performance and exams
May 3	6	Elocution and Discussion Methods	Volumetric calculations and end point	Standard and practical method	Class performance and exams
May 4	6	Elocution and Discussion Methods	Precipitation titrations	Standard and practical method	Class performance and exams
June 1			Final Exams		

11. Course Evaluation

1. Formative evaluation through daily exams, observing the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 20% of the total.
2. Diagnostic evaluation by semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) semester exams during the year, that is, two exams for each semester, to extract the annual quest before entering the final exams.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Student solutions manual Fundamentals of Analytical chemistry, 2013. Douglas A. Skoog, Stanford university. Donald M. west, San Jose state university. F. James Holler, university of Kentucky. Stanley R. Crouch, Michigan state university.
Main references (sources)	1-Foundations of Analytical Chemistry: Written by Dr. Moayad Qasim Al-Abaiji and Dr. Thabet Saeed Al-Ghabsha, 1986. 2-Descriptive and volumetric analysis: written by Dr. Thabet Saeed Al-Ghabsha and Dr. Moayed Qasim Al-Abaiji, 1989. 3-Theoretical foundations of inorganic analytical chemistry, quantitative gravimetric and volumetric analysis: written by Dr. Hadi Kazem Awad and others, 1986. 4- Journal of Analytical Chemistry. 5-Journal of Chemical Africa. 6-Talanta.
Recommended books and references (scientific journals, reports ...)	Access to everything that is current and published in peer-reviewed scientific journals
Electronic References, Websites	1-Chemistry Dictionary. 2-Material Safety Data Sheet. 3-The Merck Index. 4-Publisher Springer https://www.Sprenger.com/ . 5-Publisher Elsevier https://www.Scopus.com/ . 6-Google Scholar https://scholar.google.com/ . 7-Academia https://www.Academia.com/ 8-Research Gate https://www.researchgate.net/ . 9- Science Direct https://www.sciencedirect.com/ .

Course description form

1. Course name	
Foundations of education	
2. Course code	
The first stage	
3. Semester/year	
The year is 2025 -2026	
4. The date this description was prepared	
18/9/2025	
5. Available forms of attendance	
Attend my class + electronic class on google classroom It will be a supporting class for the attendance class according to the controls and instructions of the Ministry of Higher Education and Scientific Research	
6. Number of study hours (total) / number of units (total)	
2 hours per week = 60 hours / units 2 units	
7. Name of the course administrator (if more than one name is mentioned)	
Name: M. Intisar Modheher Khiero	Email: Intisar.modheher @tu.edu.iq
8. Course objectives	
1. It aims to make students know the general foundations and principles on which education is based by reviewing a group of foundations such as the historical, social, economic and scientific foundations. 2. Developing values in Arab and Islamic education 3. Teaching female students the skills of researching education throughout history	Objectives of the study subject
9. Teaching and learning strategies	
Standard method (lectures) - Method of discussion and interrogation - Method of solving problems	The strategy

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Achievement tests	Lecture and discussion	Foundations of education	Educational and psychological sciences	2	September -3
=	=	The meaning of education and the goals of education	=	2	September-4
=	=	The necessities and importance of education	=	2	October 1
=	=	Educational theories	=	2	October 2
=	=	Fields of education	=	2	October 3
=	=	Historical basis	=	2	October 4
=	=	Development of the foundations of education	=	2	November 1
=	=	Education in primitive societies	=	2	November 2
=	=	Chinese education	=	2	November 3
=	=	Greek	=	2	November 4
=	=	Arab Islamic education	=	2	December 1
=	=	Education in the pre-Islamic era	=	2	December 2
=	=	Media of Arab educational thought / Ibn Khaldun	=	2	December3
=	=	A younger son	=	2	December 4
=	=	Al-Ghazali	=	2	January 1
=	=	Modern Education /	=	2	January 2

		Jean-Jacques Rousseau			
=	=	John Dewey	=	2	February 1
=	=	Social basis	=	2	February 2
=	=	The relationship of education with society	=	2	February 3
=	=	The relationship of education to the environment	=	2	February 4
=	=	Congenital education	=	2	The application period is (45) days from 3/1/2024 until 4/15/2024.
=	=	Health education	=	2	April 3
=	=	Family education	=	2	April 4
=	=	Economic basis	=	2	May 1

11. Course evaluation

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.

The degree is distributed through several channels:

1- Formative (formative) assessment through daily exams, observing and following up on the student's performance in class discussions and homework assignments, and classroom evaluation.

Her grade does not exceed 20% of the total.

2- Diagnostic evaluation of the semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) exams for each semester, two exams, to extract the annual endeavor before entering the final exams.

12. Learning and teaching resources

Foundations of education	Required textbooks (methodology, if any)
Books on history, sociology, and economics	Main references (sources)
Educational philosophies-Educational meeting	Recommended supporting books and references (scientific journals, reports...)
Educational and psychological websites	Electronic references, Internet sites

Course Description Form

1. Course Name:
Computer (computer basics)
2. Course Code:
3. Semester / Year:
2025-2026/ First Year
4. Description Preparation Date:
18/9/2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours: 30 hours theoretical hours (1 theoretical hour per week) & classroom : _ https://classroom.google.com/c/ODA5MjY3OTEwMDU3?cjc=zfh7re5q
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer Areej Ali Hussein Al-Rasheed email : areej.ali@tu.edu.iq
8. Course Objectives
This course aims to provide the student with : - Providing the student initially with the main concepts of computer use, its basic applications, the main components of the computer, computer software (its hardware and software components), computer networks, the Internet, basic issues when using information and communications technology, related concepts, how to represent and process data, and computer operating systems. - Providing the student with the basic skills in dealing with some Microsoft Office package program using the Windows 10 operating system, windows, icons, the mouse, and keyboard, dealing with file computer settings, and the printer. Then the student moves on to learning to create documents using programs (the text editing program known as Word, the program for creating tables, and the program presentations), and using programs for copying and downloading files, playing videos, etc. Providing student with the skills to deal with the Internet, its most important services, computer networks, the protection, and how to benefit from them, so that the student can use the computer and the Internet in academic and professional life in the future efficiently and effectively.

9. Teaching and Learning Strategies

Strategy	• The standard (lecture) method for lecture topics, relying on approved sources. • Explanation and clarification using the fraud device. • Discussion, asking questions, dialogue, and psychological description. • Small group teaching and follow-up questions. • Conduct research and reports on the topics of determining courses and discussing reports and appropriations within the evaluation. • Using e-learning and e-learning, and using educational tools as teaching aids and educational films via the Classroom electronic platform. • Self-learning method by supporting a role-centered learning environment to encourage students to take responsibility for realizing their own goals and adapting to new challenges in the world of knowledge and intellectual and cultural development.
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10.Course structure

Course level : First year

Course Name: Computer (computer basics)

Evaluation methods	Learning methods	Subjects name	Learning methods outcomes	Hours	Weeks
Class performance and exams	Standard method And discussion	Chapter One: Introduction to computers	Introduction to the computer and the stages of its development over time - computer features and areas of use - Hardware and software concepts and their components	1	1
Class performance and exams	Standard method And discussion	Chapter One: Introduction to computers	∇The concept of computing, data and information - Applications of information electronics and communication technology (IECT) - Connecting input/output devices, and peripherals to CPU	1	2
Class performance and exams	Standard method And discussion	Chapter Two : Computer Components	Computer components and physical parts - Computer Portions – Hardware Parts	1	3
Class performance and exams	Standard method And discussion	Chapter Two : Computer Components	I/O Units	1	4
Class performance and exams	Standard method And discussion	Chapter Two : Computer Components	Memory Types, Basic CPU Components	1	5
Class performance and exams	Standard method And discussion	Chapter Two : Computer Components	Computer Ports, Personal computer, Personal Computer (Features and Types)	1	6
Class performance and exams	Standard method And discussion	Chapter Three: Operating System and Graphical User Interface UI	Operating System; Basics of Common operating Systems	1	7
Class performance and exams	Standard method And discussion	Chapter Three: operating System and Graphical User Interface UI	The User Interface, Using Mouse Techniques; Use of Common Icons	1	8

Class performance and exams	Standard method And discussion	Chapter Three: operating System and Graphical User Interface UI	Status Bar - Using Menu and Menu-selection	1	9
Class performance and exams	Standard method And discussion	Chapter Three: operating System and Graphical User Interface UI	Concept of Folders and Directories, Opening and closing of different Windows - Creating Short cuts	1	10
Class performance and exams	Standard method And discussion	Chapter Four: Word Processing	Word Processing Basics - Opening and Closing of documents	1	11
Class performance and exams	Standard method And discussion	Chapter Four: Word Processing	Text creation and Manipulation - Formatting of text	1	12
Class performance and exams	Standard method And discussion	Chapter Four: Word Processing	Table handling - Spell check	1	13
Class performance and exams	Standard method And discussion	Chapter Four: Word Processing	language setting and thesaurus - Printing of word document	1	14
First semester exam					15
Mid-year holiday					16
Class performance and exams	Standard method And discussion	Chapter Five: Spread Sheet	Basics of Spreadsheet; Manipulation of cells	1	17
Class performance and exams	Standard method And discussion	Chapter Five: Spread Sheet	Formulas and Functions		18
Class performance and exams	Standard method And discussion	Chapter Five: Spread Sheet	Editing of Spread Sheet,	1	19
Class performance and exams	Standard method And discussion	Chapter Five: Spread Sheet	Printing of Spread Sheet		20
Class performance and exams	Standard method And discussion	Chapter Six: Presentation Software (Power Point)	Basics of presentation software	1	12
Class performance and exams	Standard method And discussion	Chapter Six: Presentation Software (Power Point)	Creating Presentation		22
Class performance and exams	Standard method And discussion	Chapter Six: Presentation Software`	Preparation and Presentation of Slides - Slide Show	1	23
Class performance and exams	Standard method And discussion	Chapter Six: Presentation Software (Power Point)	Taking printouts of presentation / handouts		24
Class performance and exams	Standard method And discussion	Chapter Seven: Introduction to Internet and Web Browsers	Computer networks Basic; LAN, WAN - Concept of Internet and its Applications; connecting to internet; World Wide Web	1	25
Class performance and exams	Standard method And discussion	Chapter Seven: Introduction to Internet and Web Browsers	Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address	3	26

Class performance and exams	Standard method And discussion	Chapter Eight: Communications and Emails	Basics of electronic mail; Getting an email account; Sending and Receiving Emails	3	27
Class performance and exams	Standard method And discussion	Chapter Eight: Communications and Emails	Accessing sent emails; Using Emails; Document collaboration	3	28
Class performance and exams	Standard method And discussion	Chapter Nine: Computer Troubleshooting	Identifying and solving common hardware and software problems that computer users encounter	3	29
	Standard method And discussion	Chapter Nine: Computer Troubleshooting	Basic troubleshooting techniques and tools for diagnosing and resolving issues	3	30
Second semester exam					

1. Course Evaluation	
Score distribution out of 100, divided as follows: - 50 marks for annual follow-up, divided into 25 marks for the first semester, 25 marks for the second semester (the student seeks to obtain 50 marks annually for the monthly and daily tests for the first semester and for the second semester) The semester, which includes various elements, including the student (semester exam + Reports + Daily Assignments + Academic Assignments + Other Activities) - 50 marks for the final exam	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Al-Khader Ali Al-Khader, "Computer Basics" 2016 • Adel Abdel Nour, "Introduction to the World of Artificial Intelligence," 2005. • Subject lecture's notes.
Main references (sources)	• Computer basics and office applications, Part One - Ministry of Higher Education and Scientific Research - Department of Research and Development
Recommended books and references (scientific journals, reports...)	• Bakro, Khaled (2018). Computer Fundamentals, Shuaa Publishing and Science, Halab - Syria, First edition. • Ali, Abdullah Mahdi (1998). Computer and the Modern Method, Dar Alam al-Kutub for Publishing and Distribution, first edition. • Rihawi, Mahmoud (1998). Personal Computer User Guide, Shuaa Publishing and Sciences, first edition. • Al-Qadi, Ziad (2007). Operating Systems, Dar Al Maysarah. • The Arab Encyclopedia of Computers and the Internet. • Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020). • Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete" 16th Edition (2020). • Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024).
Electronic References Websites	• http://21za.com/computer/first_about_computer.htm • http://www.opendirectoriesite.info • http://ar.wikipedia.org/wiki • http://www.vercon.sci.eg/Materials/2_1.html#menu • Operating System Share by Groups for Sites in All Locations January 2009. • Operating system Concepts (Seventh Edition): Abraham Silberschatz, Peter Baer Galvin, Greg Gagne

Course description form

1. Course name					
Educational psychology, first stage					
2. Course code					
3. Semester/year					
Year 2025-2026					
4. The date this description was prepared					
18/9/2025					
5. Available forms of attendance					
Attend my class + electronic class on Google Class Room will be a support class for the attendance class and according to the controls and instructions of the Ministry of Higher Education and Scientific Research.					
6. Number of study hours (total) / number of units (total)					
2 hours per week = 60 hours / units 2 units					
7. Name of the course administrator (if more					
Name: M. M. Saood Rajab Hassan		Email saood.r@tu.edu.iq			
From a name mentioned)					
8. Course objectives					
The curriculum aims to prepare students to practice the teaching profession by learning about: 1- Learn about educational psychology, style, motivation, and sensory perception. 2- Learn about the types of educational psychology. 3- How to formulate behavioral goals. 4 - Knowledge of educational schools. 5 - The importance of educational applications of learning theories.			Objectives of the study subject		
9. Teaching and learning strategies					
The standard method (giving lectures). 1 - Lecture method. 2 - The method of discussion and interrogation. 3 –Brainstorming method.			The strategy		
10. Course structure: The study began on 9/17/2023 and ends on 5/19/2024, the start date of final exams.					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Class performance and exams	Lecture method	Definition of educational psychology		2	November 1
Class performance and exams	Discussion and questioning	Educational psychology stage		2	November 2

Class performance and exams	Discussion and questioning	Arab Islamic philosophy		2	November 3
Class performance and exams	Brainstorming	Modern philosophy		2	November 4
Class performance and exams	Discussion and questioning	Definition of psychology, its goals and importance		2	December1
Class performance and exams	Discussion and questioning	Treads of psychology		2	December2
Class performance and exams	Discussion and questioning	Branches of psychology		2	December 3
Class performance and exams	Discussion and questioning	Applied direction		2	December4
Class performance and exams	Discussion and questioning	Behavior and the factors affecting it		2	January1
Class performance and exams	Problem Solving	The effect of genetics on behavior		2	January2
Class performance and exams	Discussion and questioning	Interaction between genetics and environment		2	January3
Class performance and exams	Discussion and questioning	Research methods in educational psychology		2	January4
Class performance and exams	Discussion and questioning	The importance of psychology in the educational process		2	February1
Class performance and exams	Discussion and questioning	Educational goals		2	February2
		Spring break		2	February3
Class performance and exams	Discussion and questioning	Factors affecting the teaching and learning process		2	February4
Class performance and exams	Discussion and questioning	Attention and sensory perception		2	March1
Class performance and exams	Discussion and questioning	Types of attention and factors affecting it		2	March2
Class performance and exams	Discussion and questioning	Sensory perception		2	March3
Class performance and exams	Discussion and questioning	Factors affecting sensory perception		2	March4
Class performance and exams	Discussion and questioning	Learning theories		2	April1

		(conditional learning theory)			
Class performance and exams	Discussion and questioning	Clairvoyance theory		2	April2
Class performance and exams	Discussion and questioning	Transfer learning effect		2	April3
Class performance and exams	Discussion and questioning	Types of transition		2	April4
Class performance and exams	Discussion and questioning	How to benefit from transfer in the learning process		2	May1
Class performance and exams	Discussion and questioning	Feedback		2	May2
Class performance and exams	Discussion and questioning	Types of feedback		2	May3
		Review		2	May4

11. Course evaluation	
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.	
The degree is distributed through several channels:	
1- Formative (formative) assessment through daily exams, observing and following up on the student's performance in class discussions and homework assignments, and classroom evaluation. Her grade does not exceed 20% of the total. 2- Diagnostic evaluation of the semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) exams, each semester with two exams, to extract the annual endeavor before entering the final exams.	
12. Learning and teaching resources	
Educational Psychology, written by Dr. Raouf Mahmoud Al-Qaisi.	Required textbooks (methodology, if any)
1 - Educational Psychology Dr. Fouad Abu Hatab. 2 –Educational Psychology Dr.Rashid Marzouq Rashid. 3 -Educational Psychology Dr. Hanaa Hussein Al-Felfali.	Main references (sources)
Access to everything that is current and published in peer-reviewed scientific journals	Recommended supporting books and references (scientific journals, reports...)
http://www.alkutubcafe.com/book/83rjar.html	Electronic references, Internet sites

Course Description Form

1. Course name: Human Rights and Democracy/ First stage/ Chemistry Department	
2. Course code	
3. Semester/Year 2025- 2026	
4. Date of preparation of this description 9/18/2025	
5. Available forms of attendance/Class attendance + Online class onGoogle Classroom is a support class for the in-person class, according to the regulations and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of study hours (total) 17 / Number of units (total) 1	
7. Name of the course administrator (if more than one name is mentioned)	
Name: M.M. Farouk Aziz Kurdi Email: Farooq.azeez@tu.edu.iq	
8. Course objectives	
- Students should learn about the historical roots of human rights and the basic constants of human rights established by the true Islamic religion and international laws and agreements. - Students will learn about the real reasons behind the enactment of laws and declarations related to human rights. - Clarifying the concepts of rights, freedom, and duties of the individual and society, and explaining the articles related to human rights in the Iraqi Constitution. - Optimal preparation for a competent generation with a high level of knowledge about human rights and democracy.	Subject objectives

9. Teaching and learning strategies					
			Strategy		
10. Course Structure					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	Watches	The week
					October (1) October (2) October (3) October (4)
Classroom performance and exams	Standard method, text method	11/30/2025 Human rights in Greek and Egyptian civilizations	The first lecture	Start of work 1	November (1) November (2) November (3) November (4)
Classroom performance and exams	Standard method Text method	Human rights in divine laws and religions		1	December (1)
Classroom performance and exams	Standard method Text method	Human rights sources		1	December (2)
Classroom performance and examsT	Discussion and interrogation method	Human rights guarantees at the domestic level		1	December (3)
			First month exam	1	December (4)
Classroom performance and exams	Discussion and interrogation method	Human rights guarantees in Islam		1	January (1)
Classroom performance and exams	Discussion and interrogation method	Human rights guarantees at the international level		1	January (2)
Classroom performance and exams	Discussion and interrogation method	European Convention on Human Rights		1	January (3)
Classroom performance and exams	Discussion and interrogation method	Human and child rights, the emergence and development of		1	January (4)

		child rights rules			
			Second month exam		February (1)
Classroom performance and exams	Discussion and interrogation method	Children's rights in Roman civilization		1	February (2)
			Starts on Saturday 17/2/2026a nd ends on Thursday 24/2/2026	Spring break	February (3)
Classroom performance and exams	Discussion and interrogation method	Children's rights in Islam		1	February (4)
Classroom performance and exams	Discussion and interrogation method	Democracy		1	March (1)
			First exam after the first half	1	March (2)
Classroom performance and exams	Discussion and interrogation method	The emergence of Marxist ideology		1	March (3)
Classroom performance and exams	Discussion and interrogation method	Democracy between universality and privacy		1	March (4)
Classroom performance and exams	Method of discussion, dialogue and interrogation	Forms of democracy		1	April (1)
			Second exam		April (2)
Classroom performance and exams	Discussion and interrogation method	Representative system and its nature		1	April (3)
Classroom performance and exams	Discussion and interrogation method	Internal regulations of the House of Representatives (House of Representatives)		1	April (4)

			Third exam	1	Mays(1)
	Problem solving method	General review of human rights		1	Mays (2)
			Final exams		Mays (3) (4)

11. Course Evaluation	
The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc. 50 annual pursuit points, distributed 25 for each semester and divided as follows. 20 marks for the monthly exam. 5 points for daily activities. 50 marks for the end of the academic year exam.	
12. Learning and teaching resources	
The book Democracy: Concepts and Experiences by Dr. Hassan Latif Al-Zubaidi and Professor Nimah Muhammad Al-Abbadi Dr. Mohamed Abdel-Jabri, Democracy and Human Rights Muhammad Al-Zuhayli, Human Rights in Islam	Required textbooks (methodology if any)
	Main References (Sources)
	Recommended supporting books and references (scientific journals, reports...)
Universal Declaration of Human Rights	Electronic references, websites

Course Description Form

1. Course Name:
Analytical Chemistry
2. Course Code:
Second Year
3. Semester / Year:
Annual Course
4. Description Preparation Date:
2025/9/18
5. Available Attendance Forms:
In-person
6. Number of Credit Hours (Total) / Number of Units (Total)
120 hours / 6 units
7. Course administrator's name (mention all, if more than one name)
Name: Lecture Dr. Marwan Thaer Jalal Email: marwan.analytical@tu.edu.iq
8. Course Objectives
• Provide a general understanding of the fundamentals of quantitative gravimetric analysis, sample selection, and laboratory processing. This includes knowledge of precipitation methods, properties of precipitates, solubility, weight factor calculations, and the mechanics of precipitates, along with understanding contaminants that accompany precipitates and how to treat them. Additionally, the course covers physical and chemical separation methods. • Prepare competent and specialized personnel in analytical chemistry. • Equip students with modern methods used to convey curriculum content effectively.
9. Teaching and Learning Strategies
• Inductive (deductive) method • Problem-solving approach • Organizing training courses and seminars to build students' ability to engage with the community, conduct productive dialogue, and solve educational problems through practical methods. • Classroom interaction and exchanging opinions between students and instructors to discuss learning difficulties and potential solutions.

10. Course Structure

week	Hours	Expected Learning Outcomes	Unit/Topic Name	Learning Method	Assessment Method
October 1	5	Introduction to Analytical Chemistry	General introduction to gravimetric analysis and basic principles	Standard Method, Scientific Method	Class performance and exams
October 2	5	Classification of Gravimetric Methods	Gravimetric methods: volatilization, precipitation, separation based on chemical reactions	Standard Method, Scientific Method	Class performance and exams
October 3	5	Steps of Gravimetric Analysis	Steps in gravimetric analysis, characteristics of precipitates used	Standard Method, Scientific Method	Class performance and exams
October 4		Organic and Inorganic Precipitates	Organic and inorganic precipitants and their required conditions	Standard Method, Scientific Method	Class performance and exams
November 1	5	Solubility	Solubility, solubility product	Standard Method, Scientific Method	Class performance and exams
November 2	5	Applications of Solubility Product	Solubility applications in precipitation, examples, and problems	Standard Method, Scientific Method	Class performance and exams
November 3	5	Factors Affecting Solubility	Temperature effects, solvent effects, hydrolysis effects of slightly soluble salts, examples	Standard Method, Scientific Method	Class performance and exams
November 4	5	Influencing Factors on Solubility	Common ion, pH effects, complex ion effects, examples and problems	Standard Method, Scientific Method	Class performance and exams
December 1	5	Midterm Exam - First Semester	First semester exam	Standard Method, Scientific Method	Class performance and exams
December 2	5	Chemical Composition of Precipitates	Precipitates' chemical composition	Standard Method, Scientific Method	Class performance and exams
December 3	5	Calculating Weight Factors	Weight factor calculations	Standard Method, Scientific Method	Class performance and exams
December 4	5	Crystal Formation of Precipitates	Particle size, relative supersaturation, precipitation stages, crystal size	Standard Method, Scientific Method	Class performance and exams
January 1	5	Colloidal Precipitates	Colloidal state, agglomeration, homogeneous precipitation	Standard Method, Scientific Method	Class performance and exams
January 2	5	Contaminants in Precipitates	Types of precipitate contamination and treatment methods	Standard Method, Scientific Method	Class performance and exams
January 3	5	Precipitate Preparation	Digestion, washing, reprecipitation, drying or ignition, weight estimation	Standard Method, Scientific Method	Class performance and exams
January 4	5	Second Semester Exam	Second semester exam		
February 1	5	Separation Methods	General overview of separation methods, errors associated	Standard Method, Scientific Method	Class performance and exams

February 2	5	Solvent Extraction	Solvent extraction, distribution ratio, partition coefficient	Standard Method, Scientific Method	Class performance and exams
March 1	5	Percentage Extraction Calculations	Percentage extraction, separation efficiency, influencing factors	Standard Method, Scientific Method	Class performance and exams

11. Course Assessment

- **Formative Assessment:** This includes daily exams, observing student performance in class discussions and homework assignments, and overall classroom assessment. This accounts for a maximum of 20% of the total grade.
 - **Diagnostic Assessment:** This is conducted through midterm and final exams to determine pass/fail status, accounting for 80% of the grade. It is divided into four midterm exams throughout the year, plus two practical exams (one for each semester) to calculate the annual score before the final exams.

12. Learning and Teaching Resources

Required Textbooks (if available)	• Foundations of Analytical Chemistry, by Dr. Moayed Qassim Al-Abayji and Dr. Thabit Said Al-Ghabsha, University of Mosul, 1983. • Analytical Chemistry: Separation Methods, by Dr. Samir Abdul Rahim Said and Dr. Thabit Said Al-Ghabsha, University of Mosul, 1985.
Main References (sources):	• Analytical Chemistry, by Gary Christian, Sixth Edition. • Chemical Analysis: Modern Instrumentation Methods and Techniques, by Francis Rouessac and Annick Rouessac, Second Edition. • Modern Analytical Chemistry, by David Harvey.
Recommended Supporting Books and References (scientific journals, reports, etc.):	http://www.chemicalprocessing.com
Electronic References and Websites:	http://www.bytoco.com

Course Description Form

1. Course Name:	
Inorganic Chemistry / Second Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Assistant lecturer Noor Abdul Salam Mohammed Email: nmohammed@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	The periodic table of elements and classification of elements	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Sectors, cycles, and totals in the periodic table	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Periodic properties in the periodic table	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Hydrogen and its compounds	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Group one elements	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Group one reactions	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	Group one compounds and their uses	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	Group tow elements	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Group tow reactions	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Group tow compounds and their uses	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Group three elements	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Group three compounds	Standard method, practical method	Grades and exams

January 1	2	Presentation method Discussion method	Aluminum element and its compounds	Standard method, practical method Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Group four elements	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Group four compounds and reactions	Standard method, practical method	Grades and exams
January 4			First Semester Exams		
February 1	2	Presentation method Discussion method	The elements of the fifth group	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Nitrogen compounds	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method	Phosphorus element	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	The elements of the sixth group	Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method	Oxygen	Standard method, practical method	Grades and exams

March 4	2	Presentation method Discussion method	Hydrogen sulfide derivatives	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	The elements of the seventh group	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Halide compounds with oxygen	Standard method, practical method	Grades and exams

April 3	2	Presentation method Discussion method	Halides	Standard method, practical method	Grades and exams Grades and exams
April 4	2	Presentation method Discussion method	Preparation of halides	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	The elements of the eighth group (inert)	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Uses of the elements of the eighth group	Standard method, practical method	Grades and exams
May 3			Second semester exam		
May 4			General review	Problem-solving method	
May 15			Final exams		

11. Course Evaluation	
Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.	
12. Learning and Teaching Resources	
Required textbooks (methodology if available)	Inorganic Chemistry / Chemistry Department
Main references (sources)	1- Inorganic Chemistry (Representative Elements Chemistry) by Dr. Mahdi Naji Zakum. 2- Inorganic Chemistry Dr. Issam Georges, University of Mosul, Mosul, 1st ed., 1982 AD.
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course Description Form

10. Course Name:
Advanced Computing
11. Course Code:
12. Semester / Year:
2025-2026/ Second Year
13. Description Preparation Date:
18/9/2025
14. Available Attendance Forms:
Attendance
15. Number of Credit Hours (Total) / Number of Units (Total)
30 hours: 30 hours theoretical hours (1 theoretical hour per week)& classroom : https://classroom.google.com/c/ODA5MjY4NDgzNjI1?cjc=v4sb7xv2
16. Course administrator's name (mention all, if more than one name)
Name: Lecturer Areej Ali Hussein Al-Rasheed email : areej.ali@tu.edu.iq
17. Course Objectives
This course aims to provide the student with - Acquiring fundamental knowledge in computers and modern technologies, and developing skills in dealing with digital tools and office applications. - Developing skills in using digital tools and office applications, and understanding e-commerce and digital banking services. - Introduction to artificial intelligence, its technologies, and applications. - Developing problem-solving and troubleshooting skills, and instilling digital values and ethics. - Enhancing the ability for scientific research and using electronic sources, while promoting critical thinking and social responsibility in technology use.
18. Teaching and Learning Strategies

Strategy	• Delivering lectures with practical application of lecture topics, relying on approved sources. • Explanation and clarification using a data projector. • Discussion, asking questions, dialogue, and brainstorming. • Small group teaching and continuous follow-up with questions. • Conducting research and reports on course syllabus topics and discussing those reports, including them in the assessment. • Using e-learning methodology and blended learning.
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10.Course structure					
Course Level: Second year					
Course Name: Advanced Computing					
Evaluation methods	Learning methods	Subjects name	Learning methods outcomes	Hours	Weeks
First semester of the academic year					
Classroom performance and daily tests	Method - Scientific quality	Chapter One	Security and Networking: What is a network? Types of networks. Basic network components. Network Security Basics. Understanding network threats. Network Troubleshooting	1	1
Classroom performance and daily tests	Method - Scientific quality	Chapter One	Security and Networking: What is a network? Types of networks. Basic network components. Network Security Basics. Understanding network threats. Network Troubleshooting	1	2
Classroom performance and daily tests	Method - Scientific quality	Chapter Two	E-Commerce: Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking	1	3
Classroom performance and daily tests	Method - Scientific quality	Chapter Two	E-Commerce: Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking	1	4
Classroom performance and daily tests	Method - Scientific quality	Chapter Three	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic	1	5

			troubleshooting techniques and tools for diagnosing and resolving issues.		
Classroom performance and daily tests	Method - Scientific quality	Chapter Three	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues.	1	6
Classroom performance and daily tests	Method - Scientific quality	Chapter Three	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues.	1	7
Classroom performance and daily tests	Method - Scientific quality	Chapter Three	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues.	1	8
Classroom performance and daily tests	Method - Scientific quality	Chapter Four	Introduction to AI: Definition of AI, History of AI, AI techniques and Approaches, Challenges and Ethical considerations.	1	9
Classroom performance and daily tests	Method - Scientific quality	Chapter Four	Introduction to AI: Definition of AI, History of AI, AI techniques and Approaches, Challenges and Ethical considerations.	1	10
Classroom performance and daily tests	Method - Scientific quality	Chapter Four	Introduction to AI: Definition of AI, History of AI, AI techniques and Approaches, Challenges and Ethical considerations.	1	11
Classroom performance and daily tests	Method - Scientific quality	Chapter Four	Introduction to AI: Definition of AI, History of AI, AI techniques and Approaches, Challenges and Ethical considerations.	1	12
Classroom performance and daily tests	Method - Scientific quality	Chapter Five	AI in Our Daily Lives: AI in smartphones and virtual assistants like .Siri or Google Assistant	1	13
Classroom performance and daily tests	Method - Scientific quality	Chapter Five	AI in Our Daily Lives: AI in smartphones and virtual assistants like .Siri or Google Assistant	1	14
Classroom performance and daily tests	Method - Scientific quality	Chapter Five	AI in Our Daily Lives: AI in smartphones and virtual assistants like .Siri or Google Assistant		15
Classroom performance and daily tests	Method - Scientific quality	Chapter Five	AI in Our Daily Lives: AI in smartphones and virtual assistants like .Siri or Google Assistant	1	16

First semester exam					
Med term					17-18
Second semester					
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	19
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	20
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	21
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	22
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	23
Classroom performance and daily tests	Method - Scientific quality	Chapter Six	Applications of AI: Education, Healthcare, Finance, Transportation, .Marketing and Advertising	1	24
Classroom performance and daily tests	Method - Scientific quality	Chapter Seven	AI and Society: (How AI affects social, AI and international relations, AI and the future of humanity.)	1	25
Classroom performance and daily tests	Method - Scientific quality	Chapter Seven	AI and Society: (How AI affects social, AI and international relations, AI and the future of humanity.)		26
Classroom performance and daily tests	Method - Scientific quality	Chapter Eight	Ethical Challenges in AI :(AI ethics, privacy and surveillance, the impact of AI on the job market.)	1	27
Classroom performance and daily tests	Method - Scientific quality	Chapter Eight	Ethical Challenges in AI :(AI ethics, privacy and surveillance, the impact of AI on the job market.)		28
Classroom performance and daily tests	Method - Scientific quality	Chapter Nine	The Future of AI (Future trends in AI, recent research and emerging technologies.	1	29
Classroom performance and daily tests	Method - Scientific quality	Chapter Nine	The Future of AI (Future trends in AI, recent research and emerging technologies.	3	30
Second semester exam					

3. Course Evaluation

Score distribution out of 100, divided as follows:

- 50 marks for annual follow-up, divided into 25 marks for the first semester, 25 marks for the second semester (the student seeks to obtain 50 marks annually for the monthly and daily tests for the first semester and for the second semester) The semester, which includes various elements, including the student (semester exam + Reports + Daily Assignments + Academic Assignments + Other Activities)

- 50 marks for the final exam

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Al-Khader Ali Al-Khader, "Computer Basics" 2016 • Adel Abdel Nour, "Introduction to the World of Artificial Intelligence," 2005. • Subject lecture's notes.
Main references (sources)	• Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020) • Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete" 16th Edition (2020). • Ahmed Banafa, "Introduction to Artificial Intelligence (AD", 1st Edition (2024).
Recommended books and references (scientific journals, reports...)	• Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete" 16th Edition (2020). • Ahmed Banafa, "Introduction to Artificial Intelligence (AD", 1st Edition (2024).
Electronic References, Websites	

Course Description Form

1. Course Name:	
Physical chemistry / 2 nd year	
2. Course Code:	
3. Semester / Year:	
Annual / 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes (Google Classroom), which will be a supporting class for the in-person class, and according to the conditions and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
120 hours per year / 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Saddam Mohammed Ahmed Al-Mahmoud Email: s_almahmoud@tu.edu.iq	
8. Course objectives	
Course objectives	- Providing students with knowledge of the principles of thermodynamics as one of the basic branches of physical chemistry. - Developing students' ability by knowing the most important scientific concepts and rules that must be followed to understand the mechanisms of chemical reactions and how to control them. - Teaching students how to use and apply laws in the practical aspect. - Preparing students to practice the career of teaching chemistry in the academic institutions.
9. Teaching and Learning Strategies	
Strategy	1- Standard method (lectures). 2- Discussion and Questioning method. 3- practical method.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Sep. 4	4		General properties of gases	Standard and practical method	Class performance and exams
Oct. 1	4		Ideal gas laws	Standard and practical method	Class performance and exams
Oct. 2	4		Kinetic theory of ideal gases	Standard and practical method	Class performance and exams
Oct. 3	4		The First law of thermodynamics	Standard and practical method	Class performance and exams
Oct. 4	4		Types of thermodynamic processes	Standard and practical method	Class performance and exams
Nov. 1	4		Energy and enthalpy	Standard and practical method	Class performance and exams
Nov. 2	4		Thermochemistry	Standard and practical method	Class performance and exams
Nov. 3	4		Phase transition enthalpies	Standard and practical method	Class performance and exams
Nov. 4	4		Heat of formation	Standard and practical method	Class performance and exams
Des. 1	4		Heat of combustion	Standard and practical method	Class performance and exams
Des. 2	4		heat of neutralization	Standard and practical method	Class performance and exams
Des. 3	4		Bond energies	Standard and practical method	Class performance and exams
Des.4	4		The Second law of thermodynamics	Standard and practical method	Class performance and exams
Jan. 1	4		Entropy	Standard and practical method	Class performance and exams
Jan. 2	4		Calculate the change in entropy	Standard and practical method	Class performance and exams
Jan. 3	Spring holiday				
Jan. 4					
Feb. 1	4		The Third law of thermodynamics	Standard and practical method	Class performance and exams
Feb. 2	4		The Free energy	Standard and practical method	Class performance and exams
Feb. 3	4		Standard free energy of formation	Standard and practical method	Class performance and exams

Feb. 4	4		Chemical potential	Standard and practical method	Class performance and exams
Mar. 1	4		Chemical equilibrium	Standard and practical method	Class performance and exams
Mar. 2	4		Law of mass action	Standard and practical method	Class performance and exams
Mar.3	4		Lee-chatelier Brown rule	Standard and practical method	Class performance and exams
Mar. 4	4		The equilibrium constant changes with temperature	Standard and practical method	Class performance and exams
Apr. 1	4		Phase equilibria	Standard and practical method	Class performance and exams
Apr. 2	4		Uses of the phase rule	Standard and practical method	Class performance and exams
Apr. 3	4		Surface tension	Standard and practical method	Class performance and exams
Apr. 4	4		Adsorption	Standard and practical method	Class performance and exams
May. 1	4		Examples and solutions	Standard and practical method	Class performance and exams
May. 2	4		General Review	Standard and practical method	Class performance and exams

11. Course Evaluation

1. Formative evaluation through daily exams, observing the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 20% of the total.
2. Diagnostic evaluation by semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) semester exams during the year, that is, two exams for each semester, to extract the annual quest before entering the final exams.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Physical chemistry", Written by Laila Muhammad Naguib and Mahmoud Shaker Saeed., Mosul University, college of Education, 1990.
Main references (sources)	"Atkins' Physical Chemistry". Peter Atkins, Julio de Paula, James Keeler, 11 th Ed. 2018.
Recommended books and references (scientific journals, reports ...)	Access to everything that is current and published in peer-reviewed scientific journals
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name:
Analytical Chemistry
2. Course Code:
Second Year
3. Semester / Year:
Annual Course
4. Description Preparation Date:
2025/9/18
5. Available Attendance Forms:
In-person
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 7 units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Lecturer Yasmeeen Mutasher Khadr Email: ykhather@tu.edu.iq
8. Course objectives
- Provide a general understanding of the fundamentals of quantitative gravimetric analysis, sample selection, and laboratory processing. This includes knowledge of precipitation methods, properties of precipitates, solubility, weight factor calculations, and the mechanics of precipitates, along with understanding contaminants that accompany precipitates and how to treat them. Additionally, the course covers physical and chemical separation methods. - Prepare competent and specialized personnel in analytical chemistry. - Equip students with modern methods used to convey curriculum content effectively.
9. Teaching and Learning Strategies
- Inductive (deductive) method - Problem-solving approach - Organizing training courses and seminars to build students' ability to engage with the community, conduct productive dialogue, and solve educational problems through practical methods. - Classroom interaction and exchanging opinions between students and instructors to discuss learning difficulties and potential solutions.

10. Course Structure

week	Hours	Expected Learning Outcomes	Unit/Topic Name	Learning Method	Assessment Method
October 1	5	Introduction to Analytical Chemistry	General introduction to gravimetric analysis and basic principles	Standard Method, Scientific Method	Class performance and exams
October 2	5	Classification of Gravimetric Methods	Gravimetric methods: volatilization, precipitation, separation based on chemical reactions	Standard Method, Scientific Method	Class performance and exams
October 3	5	Steps of Gravimetric Analysis	Steps in gravimetric analysis, characteristics of precipitates used	Standard Method, Scientific Method	Class performance and exams
October 4		Organic and Inorganic Precipitates	Organic and inorganic precipitants and their required conditions	Standard Method, Scientific Method	Class performance and exams
November 1	5	Solubility	Solubility, solubility product	Standard Method, Scientific Method	Class performance and exams
November 2	5	Applications of Solubility Product	Solubility applications in precipitation, examples, and problems	Standard Method, Scientific Method	Class performance and exams
November 3	5	Factors Affecting Solubility	Temperature effects, solvent effects, hydrolysis effects of slightly soluble salts, examples	Standard Method, Scientific Method	Class performance and exams
November 4	5	Influencing Factors on Solubility	Common ion, pH effects, complex ion effects, examples and problems	Standard Method, Scientific Method	Class performance and exams
December 1	5	Midterm Exam - First Semester	First semester exam	Standard Method, Scientific Method	Class performance and exams
December 2	5	Chemical Composition of Precipitates	Precipitates' chemical composition	Standard Method, Scientific Method	Class performance and exams
December 3	5	Calculating Weight Factors	Weight factor calculations	Standard Method, Scientific Method	Class performance and exams
December 4	5	Crystal Formation of Precipitates	Particle size, relative supersaturation, precipitation stages, crystal size	Standard Method, Scientific Method	Class performance and exams
January 1	5	Colloidal Precipitates	Colloidal state, agglomeration, homogeneous precipitation	Standard Method, Scientific Method	Class performance and exams

January 2	5	Contaminants in Precipitates	Types of precipitate contamination and treatment methods	Standard Method, Scientific Method	Class performance and exams
January 3	5	Precipitate Preparation	Digestion, washing, reprecipitation, drying or ignition, weight estimation	Standard Method, Scientific Method	Class performance and exams
January 4	5	Second Semester Exam	Second semester exam		
February 1	5	Separation Methods	General overview of separation methods, errors associated	Standard Method, Scientific Method	Class performance and exams
February 2	5	Solvent Extraction	Solvent extraction, distribution ratio, partition coefficient	Standard Method, Scientific Method	Class performance and exams
March 1	5	Percentage Extraction Calculations	Percentage extraction, separation efficiency, influencing factors	Standard Method, Scientific Method	Class performance and exams

11. Course Assessment

- **Formative Assessment:** This includes daily exams, observing student performance in class discussions and homework assignments, and overall classroom assessment. This accounts for a maximum of 20% of the total grade.
 - **Diagnostic Assessment:** This is conducted through midterm and final exams to determine pass/fail status, accounting for 80% of the grade. It is divided into four midterm exams throughout the year, plus two practical exams (one for each semester) to calculate the annual score before the final exams.

12. Learning and Teaching Resources

Required Textbooks (if available)	• Foundations of Analytical Chemistry, by Dr. Muayed Qasim Al-Abayji and Dr. Thabit Said Al-Ghabsha, University of Mosul, 1983. • Analytical Chemistry: Separation Methods, by Dr. Samir Abdul Rahim Said and Dr. Thabit Said Al-Ghabsha, University of Mosul, 1985.
Main References (sources):	• Analytical Chemistry, by Gary Christian, Sixth Edition. • Chemical Analysis: Modern Instrumentation Methods and Techniques, by Francis Rouessac and Annick Rouessac, Second Edition. • Modern Analytical Chemistry, by David Harvey.
Recommended Supporting Books and References (scientific journals, reports, etc.):	http://www.chemicalprocessing.com
Electronic References and Websites:	http://www.bytoco.com

Course Description Form

1. Course Name: Organic Chemistry – 2end Stage	
2. Course Code:	
3. Semester / Year: Course for the academic year 2025-2026	
4. Description Preparation Date: 18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes on the Google Classroom platform will be a supporting class for the in-person class and according to the controls and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Eman Ayoob Yass	
Email: emanaywb@tu.edu.ig	
8. Course Objectives	
Course Objectives • Developing students' ability by identifying the most important scientific concepts and rules that must be followed by students to complete scientific research. • Urging students to obtain knowledge, information and the ability to draw conclusions. • Preparing students to practice the teaching profession and knowing how to write scientific research.	• • •
9. Teaching and Learning Strategies	
Strategy	1- The standard method (giving lectures). 2- The method of discussion and interrogation. 3- Method of solving problems. 4- Brainstorming method.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
September 3	2				Class performance and exams
September 4	2			Standard method And discussion	Class performance and exams
October 1	2			Standard method And discussion	Class performance and exams
October 2	2			Standard method And discussion	Class performance and exams
October 3	2		chemical bases	Standard method And discussion	Class performance and exams
October 4	2		chemical bases	Standard method And discussion	Class performance and exams
November 1	2		alkans	Standard method And discussion	Class performance and exams
November 2	2		Alkans	Standard method And discussion	Class performance and exams
November 3	2		Alkens	Standard method And discussion	Class performance and exams
November 4	2		Preparation of alkenes	Standard method And discussion	Class performance and exams
December 1	2		Interactions of alkenes	Standard method And discussion	Class performance and exams
December 2	2		Monthly exam	Standard method And discussion	Class performance and exams
December 3	2		alkynes	Standard method And discussion	Class performance and exams
December 4	2		Preparation of alkynes	Standard method And discussion	Class performance and exams
January 1	2		Interactions of alkynes	Standard method And discussion	Class performance and exams
January 2	2		Monthly exam	Standard method And discussion	Class performance and exams
January 3 January 4	2		cycloalkanes	-----	-----
	2		Cycloalkanes	-----	-----
February 1	2		Aromatic compounds	Standard method And discussion	Class performance and exams
February 1	2		Aromatic compounds	Standard method And discussion	Class performance and exams

February 1	2		Monthly exam	Standard method And discussion	Class performance and exams
February 1	2		arens	Standard method And discussion	Class performance and exams
March 1	2		arens	Standard method And discussion	Class performance and exams
March 2	2		Spring break	Standard method And discussion	Class performance and exams
March 3	2		Alkel halides	Standard method And discussion	Class performance and exams
March 4	2		Alkel halides	Standard method And discussion	Class performance and exams
April 1	2		Monthly exam	Standard method And discussion	Class performance and exams
April 2	2		alcoholes	Standard method And discussion	Class performance and exams
April 3	2		Alcohols nomanycolure	Standard method And discussion	Class performance and exams
April 4	2		Preparation of Alcohols	Standard method And discussion	Class performance and exams
Mays1	2		Preparation of Alcohols	Standard method And discussion	Class performance and exams
Mays 2	2		Alcohols interactions	Standard method And discussion	Class performance and exams
Mays 3	2		Alcohols interactions	Standard method And discussion	Class performance and exams

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name:	
Biochemistry / third stage	
2. Course Code:	
3. Semester / Year:	
Yearly	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Lectures in person presence with electronic classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours/2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Asmaa Hashim Shaker Email : dr.asmaa@tu.edu.iq	
8. Course Objectives	
Course Objectives 1- Developing students' ability to follow and understand the conversation and developing their ability to distinguish between main and secondary ideas. 2- Urging students to obtain knowledge, information and the ability to draw conclusions. 3- Developing their abilities to make quick and comprehensive summaries of aspects of the topic.	
9. Teaching and Learning Strategies	
Strategy	Strategy can be defined as a set of general rules and broad lines that concern the means of achieving the desired goals of teaching and indicate the methods and plans followed by faculty members to reach the learning goals.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Oct. 1	2	Method of presentation and method of discussion	carbohydrates	The standard method, the practical method	Class performance and exams
Oct. 2	2	Method of presentation and method of discussion	carbohydrates	The standard method, the practical method	Class performance and exams
Oct. 3	2	Method of presentation and method of discussion	carbohydrates	The standard method, the practical method	Class performance and exams
Oct. 4	2	Method of presentation and method of discussion	carbohydrates	The standard method, the practical method	Class performance and exams
Nov. 1	2	Method of presentation and method of discussion	Lipids	The standard method, the practical method	Class performance and exams
Nov.2	2	Method of presentation and method of discussion	Lipids	The standard way, the practical way	Class performance and exams
Nov.3	2	Method of presentation and method of discussion	Lipids	The standard method , the practical method	Class performance and exams
Nov.4	2	Method of presentation and method of discussion	Lipids	The standard method , the practical method	Class performance and exams
Dec. 1	2	Method of presentation and method of discussion	Lipids	The standard method, the practical method	Class performance and exams
Dec. 2	2	Method of presentation and method of discussion	Amino acids	Standard method	Class performance and exams
Dec. 3	2	Method of presentation and method of discussion	Amino acids	Standard method	Class performance and exams
Dec. 4	2	Method of presentation and method of discussion	Amino acids	Standard method	Class performance and exams
Jan. 1	2	Method of presentation and method of discussion	Proteins	Standard method	Class performance and exams
Jan. 2	2	Method of presentation and method of discussion	Proteins	Standard method	Class performance and exams
Jan. 3	2	Method of presentation and method of discussion	Enzymes	Standard method	Class performance and exams
Jan. 4	2	/	Enzymes		
Feb.1	2	Method of presentation and method of discussion	Enzymes	Standard method	Class performance and exams
Feb.2	2	Method of presentation and method of discussion	Enzymes	Standard method	Class performance and exams
Mar. 1	2	Method of presentation and method of discussion	Vitamins	Standard method	Class performance and exams

Mar. 2	2	Method of presentation and method of discussion	Vitamins	Standard method	Class performance and exams
Mar. 3	2	Method of presentation and method of discussion	Nucleic acids	Standard method	Class performance and exams
Mar. 4	2	Method of presentation and method of discussion	Nucleic acids	Standard method	Class performance and exams
Apr. 1	2	Method of presentation and method of discussion	Nucleic acids	Standard method	Class performance and exams
Apr. 2	2	Method of presentation and method of discussion	Nucleic acids	Standard method	Class performance and exams
Apr. 3	2	Method of presentation and method of discussion	Hormones	Standard method	Class performance and exams
Apr. 4	2	Method of presentation and method of discussion	Hormones	Standard method	Class performance and exams
May 1	2	Method of presentation and method of discussion	Hormones	Standard method	Class performance and exams
May2	2	Method of presentation and method of discussion	Hormones	Standard method	Class performance and exams
May3	2		Hormones		
May5	2		Final exams	Problem-solving method	
May 15	2		Final exams		

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reportsetc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	

Main references(sources):

- Biochemistry by Qusay Chalabi
- The central library at the university, and the college library
- International Information Network (Internet)
- The prescribed curriculum for study according to the vocabulary approved by the Ministry

See help resources

Course Description Form

19.	Course Name:	Research Mythology / Third Stage	
20.	Course Code:		
21.	Semester / Year:	2025-2026/ Third Year	
22.	Description Preparation Date:	18/9/2025	
23.	Available Attendance Forms:	In-class attendance + online classes on the (Google Classroom) platform serve as a supplementary class to the in-person session, in accordance with the regulations and guidelines of the Ministry of Higher Education and Scientific Research. https://classroom.google.com/c/ODA5MjY3NjY4OTE0?cjc=rfogqlzn	
24.	Number of Credit Hours (Total) / Number of Units (Total)	60 hours: 30 hours theoretical hours / 2 theoretical hours per week	
25.	Course administrator's name (mention all, if more than one name)	Name: Lecturer Areej Ali Hussein Al-Rasheed email : areej.ali@tu.edu.iq	
26.	Course Objectives	This course aims to provide the student with : - Enhancing students' ability to understand the scientific principles that must be followed to conduct scientific research. - Developing students' understanding of the fundamentals of research methodology and recognizing the importance of ethics in scientific research. - Teaching students how to effectively search for and analyze information using precise methodology for data collection and analysis. - Developing students' skills in seeking scientific knowledge and utilizing modern information sources. - Helping students understand the impact of scientific research on the environment and society. - Preparing students for a teaching career and guiding them on how to write scientific research.	
27. Teaching and Learning Strategies			
Strategy	- Standard Method (Lecture Method). - Discussion and Inquiry Method. - Problem-Solving Method. - Brainstorming Method.		

10.Course structure					
Course level : Third year					
Course Name: Research Mythology					
Semester: First					
Evaluation methods	Learning methods	Subjects name	Learning methods outcomes	Hours	weeks
Classroom Performance and Examinations	Standard Method Discussion	The Emergence and Development of Science		2	1
Classroom Performance and Examinations	Standard Method Discussion	Objectives of Science		2	2
Classroom Performance and Examinations	Standard Method Discussion	Scientific Research		2	3
Classroom Performance and Examinations	Standard Method Discussion	Types of Scientific Research		2	4
Classroom Performance and Examinations	Standard Method Discussion	The Problem		2	5
Classroom Performance and Examinations	Standard Method Discussion	Defining the Problem Title		2	6
Classroom Performance and Examinations	Standard Method Discussion	Preparing the Research Plan		2	7
Classroom Performance and Examinations	Standard Method Discussion	Research Methodologies and Tools		2	8
Classroom Performance and Examinations	Standard Method Discussion	Historical Method, Survey Method		2	9
Classroom Performance and Examinations	Standard Method Discussion	Descriptive Method, Statistical Method		2	10
Classroom Performance and Examinations	Standard Method Discussion	Experimental Method		2	11
Classroom Performance and Examinations	Standard Method Discussion	Other Research Methodologies		2	12
Classroom Performance and Examinations	Standard Method Discussion	Main Requirements for Conducting Research		2	13
Classroom Performance and Examinations	Standard Method Discussion	Types of Errors and Their Sources		2	14
Classroom Performance and Examinations	Standard Method Discussion	Fundamental Components of Laboratory Experiments		2	15
Classroom Performance and Examinations	Standard Method Discussion	Written Sources - Personal Exchange of Information		2	16
Half Year Vacation					
Semester: Second					
Classroom Performance and Examinations	Standard Method Discussion	Modern Scientific Research (Tools Internet Research Sites) and Artificial Intelligence		2	19
Classroom Performance and Examinations	Standard Method Discussion	Documenting Scientific Research		2	20
Classroom Performance and Examinations	Standard Method Discussion	Writing Style and Overall Format		2	21
Classroom Performance and Examinations	Standard Method Discussion	Main Sections of Research Papers			22
Classroom Performance and Examinations	Standard Method Discussion	Abstract		2	23

Classroom Performance and Examinations	Standard Method Discussion	Introduction		2	24
Classroom Performance and Examinations	Standard Method Discussion	Materials and Methods		2	25
Classroom Performance and Examinations	Standard Method Discussion	Results		2	26
Classroom Performance and Examinations	Standard Method Discussion	Discussion		2	27
Classroom Performance and Examinations	Standard Method Discussion	Illustrative Figures		2	28
Classroom Performance and Examinations	Standard Method Discussion	Final Presentation of the Research			29
Review				2	30

3.Course Evaluation

Score distribution out of 100, divided as follows:

- The distribution is as follows: 50 marks for annual follow-up, divided into 25 marks for the first semester, 25 marks for the second semester (the student seeks to obtain 50 marks annually for the monthly and daily tests for the first semester and for the second semester) The semester, which includes various elements, including the student (semester exam + Reports + Daily Assignments + Academic Assignments + Other Activities)
- 50 marks for the final exam

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Research Methodology" by Dr. Muthanna Abdul Razzaq Al-Amar • Subject lecture's notes.
Main references (sources)	• "Scientific Research Methodologies" by Prof. Dr. Muhammad Sarhan Ali Al-Mahmoudi (2019), Republic of Yemen – Sana'a, Dar Al-Kutub, 3rd Edition. • "Fundamentals of Scientific Research", First Edition, Egyptian Scientists Foundation.
Recommended books and references (scientific journals, reports...)	University Student Guide to Writing Scientific Research, Beni Suef University, 2020. Generative Artificial Intelligence in Education, Saudi Data and Artificial Intelligence Authority, 2023.
Electronic References, Websites	https://scholar.google.com/ , https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name:	
Physical Chemistry	
2. Course Code:	
3 rd year	
3. Semester / Year:	
Semester	
4. Description Preparation Date:	
18 /9/2025	
5. Available Attendance Forms:	
class and lab attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60/2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Ph.D Atallah burhis dahkeel	
Email: atallah.b@tu.edu.iq	
8. Course Objectives	
Course Objectives	- To provide students with knowledge of the principles of physical chemistry as one of the fundamental branches of chemistry. - To develop students' ability by introducing them to the key scientific concepts and rules required to understand the mechanisms of chemical reactions and how to control them. - To teach students how to utilize scientific laws and apply them in practical contexts.
9. Teaching and Learning Strategies	
Strategy	- Lecture method (standard approach). - Discussion and questioning method. - Problem-solving method. - Brainstorming method.

10. Course structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
October 1	5		Chemical Kinetics	Standard and practical method	Classroom performance and exams
October 2	5		Reaction Rate	Standard and practical method	Classroom performance and exams
October 3	5		Reaction Order, Rate Constant, and Zero-Order Reactions	Standard and practical method	Classroom performance and exams
October 4	5		First-Order Reactions; Second-Order Reactions	Standard and practical method	Classroom performance and exams
November 1	5		Third-Order Reactions; nth-Order Reactions	Standard and practical method	Classroom performance and exams
November 2	5		First exam – First Semester	Standard and practical method	Classroom performance and exams
November 3	5		Methods of Determining Reaction Order: Integration Method, Half-Life Method	Standard and practical method	Classroom performance and exams
November 4	5		Differential Method; Isolation Method	Standard and practical method	Classroom performance and exams
December 1	5		Complex Reactions: Parallel and Consecutive Reactions	Standard and practical method	Classroom performance and exams
December 2	5		Reversible Reactions; Chain Reactions	Standard and practical method	Classroom performance and exams
December 3	5		Theories of Chemical Reaction Kinetics	Standard and practical method	Classroom performance and exams
December 4	5		Effect of Temperature on Reaction Rate; Arrhenius Equation	Standard and practical method	Classroom performance and examinations
January 1	5		Ionic Strength; Effect of Salt and Solvent on Reaction Rate	Standard and practical method	Classroom performance and exams

January 2	5		Second Midterm – Second Semester	Standard and practical method	Classroom performance and exams
January 3	5		Spring holiday	–	–
January 4	5		Spring holiday	–	–
February 1	5		Introduction to Electrochemistry	Standard and practical method	Classroom performance and exams
February 2	5		Faraday’s Law	Standard and practical method	Classroom performance and exams
March 1	5		Electrolytic Conductance	Standard and practical method	Classroom performance and exams
March 2	5		Effect of Molar Conductivity with Dilution	Standard and practical method	Classroom performance and exams
March 3	5		Relationship between Molar Conductance and Concentration	Standard and practical method	Classroom performance and exams
March 4	5		Ionic Mobility; Transport Number	Standard and practical method	Classroom performance and exams
April 1	5		Exams	Standard and practical method	Classroom performance and exams
April 2	5		Electrodes	Standard and practical method	Classroom performance and exams
April 3	5		Standard Electrodes and Electrode Potential	Standard and practical method	Classroom performance and exams
April 4	5		Electrochemical Cells; Types of Electrochemical Cells	Standard and practical method	Classroom performance and exams
May 1	5		Methods of Determining Cell Potential	Standard and practical method	Classroom performance and exams
May 2	5		Nernst Equation	Standard and practical method	Classroom performance and exams
May 3	5		Applications of Electromotive Force	Standard and practical method	Classroom performance and exams
May 4	5		Exams	Standard and practical method	Classroom performance and exams

11. Course evaluation	
1. 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 2. Formative assessment is conducted through observing the student's performance in classroom discussions, homework assignments, and examinations. The coursework grade constitutes 15%, with an additional 35% allocated to class activities, making a total of 50% for continuous assessment. 3. Summative assessment is carried out through the final practical and theoretical examinations in order to determine pass or fail status. This component constitutes 50% of the total grade.	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	- <i>Physical Chemistry – Kinetics</i>, Dr. Mahmoud Shaker Saeed, University of Mosul, 1990. - <i>Electrochemistry</i>, Jalal Mohammed Saleh.
Main references (sources)	- <i>Atkins' Physical Chemistry</i> , Peter Atkins, Julio de Paula, James Keeler, 11th Edition, 2018.
Recommended supporting books and references (scientific journals, reports....)	View all the latest information published in peer-reviewed scientific journals
Electronic references, internet sites	- Google Scholar - ScienceDirect - ResearchGate

Course Description Form

1. Course Name:	
Physical Chemistry	
2. Course Code:	
3 rd year	
3. Semester / Year:	
Yearly / 2025-2026	
4. Description Preparation Date:	
18 /9/2025	
5. Available Attendance Forms:	
class and lab attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60/2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Asya Akabr Tawfiq Email: asya.akbar@tu.edu.iq	
8. Course Objectives	
Course Objectives	- To provide students with knowledge of the principles of physical chemistry as one of the fundamental branches of chemistry. - To develop students' ability by introducing them to the key scientific concepts and rules required to understand the mechanisms of chemical reactions and how to control them. - To teach students how to utilize scientific laws and apply them in practical contexts.
9. Teaching and Learning Strategies	
Strategy	- Lecture method (standard approach). - Discussion and questioning method. - Problem-solving method. - Brainstorming method.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
October 1	5		Chemical Kinetics	Standard and practical method	Classroom performance and exams
October 2	5		Reaction Rate	Standard and practical method	Classroom performance and exams
October 3	5		Reaction Order, Rate Constant, and Zero-Order Reactions	Standard and practical method	Classroom performance and exams
October 4	5		First-Order Reactions; Second-Order Reactions	Standard and practical method	Classroom performance and exams
November 1	5		Third-Order Reactions; nth-Order Reactions	Standard and practical method	Classroom performance and exams
November 2	5		First exam – First Semester	Standard and practical method	Classroom performance and exams
November 3	5		Methods of Determining Reaction Order: Integration Method, Half-Life Method	Standard and practical method	Classroom performance and exams
November 4	5		Differential Method; Isolation Method	Standard and practical method	Classroom performance and exams
December 1	5		Complex Reactions: Parallel and Consecutive Reactions	Standard and practical method	Classroom performance and exams
December 2	5		Reversible Reactions; Chain Reactions	Standard and practical method	Classroom performance and exams
December 3	5		Theories of Chemical Reaction Kinetics	Standard and practical method	Classroom performance and exams
December 4	5		Effect of Temperature on Reaction Rate; Arrhenius Equation	Standard and practical method	Classroom performance and examinations
January 1	5		Ionic Strength; Effect of Salt and Solvent on Reaction Rate	Standard and practical method	Classroom performance and exams

January 2	5		Second Midterm – Second Semester	Standard and practical method	Classroom performance and exams
January 3	5		Spring holiday	–	–
January 4	5		Spring holiday	–	–
February 1	5		Introduction to Electrochemistry	Standard and practical method	Classroom performance and exams
February 2	5		Faraday's Law	Standard and practical method	Classroom performance and exams
March 1	5		Electrolytic Conductance	Standard and practical method	Classroom performance and exams
March 2	5		Effect of Molar Conductivity with Dilution	Standard and practical method	Classroom performance and exams
March 3	5		Relationship between Molar Conductance and Concentration	Standard and practical method	Classroom performance and exams
March 4	5		Ionic Mobility; Transport Number	Standard and practical method	Classroom performance and exams
April 1	5		Exams	Standard and practical method	Classroom performance and exams
April 2	5		Electrodes	Standard and practical method	Classroom performance and exams
April 3	5		Standard Electrodes and Electrode Potential	Standard and practical method	Classroom performance and exams
April 4	5		Electrochemical Cells; Types of Electrochemical Cells	Standard and practical method	Classroom performance and exams
May 1	5		Methods of Determining Cell Potential	Standard and practical method	Classroom performance and exams
May 2	5		Nernst Equation	Standard and practical method	Classroom performance and exams

May 3	5		Applications of Electromotive Force	Standard and practical method	Classroom performance and exams
May 4	5		Exams	Standard and practical method	Classroom performance and exams

11. Course evaluation	
4. 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 5. Formative assessment is conducted through observing the student's performance in classroom discussions, homework assignments, and examinations. The coursework grade constitutes 15%, with an additional 35% allocated to class activities, making a total of 50% for continuous assessment. 6. Summative assessment is carried out through the final practical and theoretical examinations in order to determine pass or fail status. This component constitutes 50% of the total grade.	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	<i>Physical Chemistry – Kinetics</i> , Dr. Mahmoud Shaker Saeed, University of Mosul, 1990. - <i>Electrochemistry</i> , Jalal Mohammed Saleh.
Main references (sources)	<i>Atkins' Physical Chemistry</i> , Peter Atkins, Julio de Paula, James Keeler, 11th Edition, 2018.
Recommended supporting books and references (scientific journals, reports....)	View all the latest information published in peer-reviewed scientific journals
Electronic references, internet sites	https://scholar.google.com https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name	
Optional /Nano/ Third Stage	
2. Course Code	
3. Semester/Year	
annual	
4. Date of preparation of this description	
18/9/2025	
5. Available Attendance Forms	
Lectures in person and electronic classes (Classroom)	
6. Number of credit hours (total) / number of units (total)	
60 hours / 2 units	
7. Course administrator's name (if more than one name is mentioned)	
Name: Dr. Ban Dawood Saleh Email:baan.saleh@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the conversation and developing their ability to distinguish between the main and secondary ideas. 2- Urging students to obtain knowledge, information and the ability to draw conclusions. 3- Develop their abilities to make quick and comprehensive summaries of the aspects of the topic.
9. Teaching and learning strategies	
Strategy can be defined as a set of general rules and outlines that are concerned with the means of achieving the desired goals of teaching and refer to the methods and plans followed by faculty members to reach the learning goals.	

10. Course Structure					
The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
October 1	2	Diction method Discussion method	Nanochemistry	Standard method, practical method	Classroom performance and exams
October 2	2	Diction method Discussion method	Nanomaterials	Standard method, practical method	Classroom performance and exams
October 3	2	Diction method Discussion method	Nanotechnology	Standard method, practical method	Classroom performance and exams
October 4	2	Diction method Discussion method	Traditional non-nanomaterials	Standard method, practical method	Classroom performance and exams
November 1	2	Diction method Discussion method	Nanomaterials or advanced materials	Standard method, practical method	Classroom performance and exams
November 2	2	Diction method Discussion method	Classification of nanomaterials and their applications	Standard method, practical method	Classroom performance and exams
November 3	2	Diction method Discussion method	Change in the properties of nanomaterials	Standard method -Practical method	Classroom performance and exams
November 4	2	Diction method Discussion method	Optical properties	Standard method -Practical method	Classroom performance and exams
December 1	2	Diction method Discussion method	Nano-optical catalysts	Standard method, practical method	Classroom performance and exams
December 2	2	Diction method Discussion method	The phenomenon of photocatalysis	Standard method	Classroom performance and exams
December 3	2	Diction method Discussion method	Methods of preparation of nanomaterials	Standard method	Classroom performance and exams
December 4	2	Diction method Discussion method	Grinding method	Standard method	Classroom performance and exams
January 1	2	Diction method Discussion method	Laser ablation method	Standard method	Classroom performance and exams
January 2	2	Diction method Discussion method	Fullerene	Standard method	Classroom performance and exams

January 3	2	Diction method Discussion method	Nanoparticles	Standard method	Classroom performance and exams
January 4	2	/	First Semester Exam		
February 1	2	Diction method Discussion method	Nanotubes	Standard method	Classroom performance and exams
February 2	2	Diction method Discussion method	Nanowires	Standard method	Classroom performance and exams
March 1	2	Diction method Discussion method	Nanocomposites	Standard method	Classroom performance and exams
March 2	2	Diction method Discussion method	Nanotechnology Applications	Standard method	Classroom performance and exams
March 3	2	Diction method Discussion method	Metals and metal alloys	Standard method	Classroom performance and exams
March 4	2	Diction method Discussion method	Polymers	Standard method	Classroom performance and exams
April 1	2	Diction method Discussion method	Composite materials	Standard method	Classroom performance and exams
April 2	2	Diction method Discussion method	Mechanical properties	Standard method	Classroom performance and exams
April 3	2	Diction method Discussion method	One-dimensional nanomaterials	Standard method	Classroom performance and exams
April 4	2	Diction method Discussion method	Two-dimensional nanomaterials	Standard method	Classroom performance and exams
May 1	2	Diction method Discussion method	Three-dimensional nanomaterials	Standard method	Classroom performance and exams
May 2	2	Diction method Discussion method	Electron microscopes	Standard method	Classroom performance and exams
May 3	2		Second Semester Exam		
May 5	2		General Review	Problem solving method	
May 15			Final Exams		

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily attendance, daily and monthly exams, reports... etc	
12. Learning and Teaching Resources	
Required textbooks (methodology, if any)	Nanochemistry / Department of Chemistry
Key references (sources)	- Adeniyi Osikoya , Wankasi Donbebe , Rrmt Vala , Ayo samuel Afolabi , Synthesis , Characterization and adsorption studies of fluorine . Helmuth Kaiser Consultancy . Nanotechnology in food and food processing Industry Worldwide , 2004
Recommended supporting books and references (scientific journals, reports...)	
Electronic references, websites	

Course Description Form

1. Course Name:	
Coordination Chemistry / Third Stage	
2. Course Code	
3. Semester / Year	
Annual 2026 / 2025	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Dina Saadi Mohamed Sabhi Email: deena3@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	Periodic table of elements and classification of elements	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Transitional elements	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Characteristics of transitional elements and their types	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Theories explaining the coordination complexes	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Double electron pair	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Coordination numbers and their geometric shapes	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	Types of complexes based on their charge	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	Ligands and their types	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Modern nomenclature of complexes	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Effective atomic number rule (18 electrons)	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Theories explaining the nature of coordination bonds	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Valence Bond Theory (V.B.T)	Standard method, practical method	Grades and exams

January 1	2	Presentation method Discussion method	Crystal Field Theory (C.F.T)	Standard method, practical method Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Splitting in octahedral complexes	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Splitting in tetrahedral complexes	Standard method, practical method	Grades and exams
January 4			First Semester Exams		
February 1	2	Presentation method Discussion method	Distorted octahedral complex	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Distorted tetrahedral complex	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method	Splitting in square planar complexes	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	Molecular Orbital Theory (M.O.T)	Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method	Molecular orbitals	Standard method, practical method	Grades and exams

March 4	2	Presentation method Discussion method	The characteristic of strain according to the theory of molecular orbitals	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	Orbital symmetry	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Molecular orbital diagram for octahedral complexes	Standard method, practical method	Grades and exams

April 3	2	Presentation method Discussion method	Molecular orbital diagram for square planar complexes	Standard method, practical method	Grades and exams Grades and exams
April 4	2	Presentation method Discussion method	Geometric isomers	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	Factors affecting the stability of complexes	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Mechanics of substitution reactions and oxidation-reduction reactions	Standard method, practical method	Grades and exams
May 3			Second semester exam		
May 4			General review	Problem-solving method	
May 15			Final exams		

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Chemistry of Transition Elements / Chemistry Department
Main references (sources)	1- Chemistry of Transition Elements - Coordination Principles (Dr. Naaman Al Nuaimi) 2- Coordination Chemistry (Translated by Dalal Ajam and Dr. Ali Hassoun Al Tayyar) 3- Chemistry of Transition Elements (Dr. Mahdi Naji Al Zakum)
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course Description Form

1. Course Name:	
Organic Chemistry - Third Stage	
2. Course Code:	
3. Semester / Year	
Annual 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes on the Google Classroom platform will be a supporting class for the in-person class and according to the controls and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Fawzi Hameed Jumaa	
Email: Fawzi.99883@tu.edu.iq	
8. Course Objectives	
Course Objectives - Providing students with knowledge of the principles of thermodynamics as one of the basic branches of physical chemistry. - Developing students' ability by knowing the most important scientific concepts and rules that must be followed to understand the mechanisms of chemical reactions and how to control them. - Teaching students how to use and apply laws in the practical aspect. - Preparing students to practice the career of teaching chemistry in the academic institutions.	
9. Teaching and Learning Strategies	
Strategy	1- The standard method (giving lectures). 2- The method of discussion and interrogation. 3- Method of solving problems. 4- Brainstorming method.

10. Course Structure					
The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
September 3	2		Stereochemistry	Standard method And discussion	Class performance and exams
September 4	2		Stereospecific reactions	Standard method And discussion	Class performance and exams
October 1	2		The forces of acids and bases	Standard method And discussion	Class performance and exams
October 2	2		Aromatic carboxylic acids	Standard method And discussion	Class performance and exams
October 3	2		Aromatic bases	Standard method And discussion	Class performance and exams
October 4	2		Cationic carbon ion - its preparation and reactions	Standard method And discussion	Class performance and exams
November 1	2		Monthly exam	Standard method And discussion	Class performance and exams
November 2	2		Migration to electron deficient nitrogen	Standard method And discussion	Class performance and exams
November 3	2		Negative carbon ion - methods of preparing it	Standard method And discussion	Class performance and exams
November 4	2		Negative carbon ion and tautomerism	Standard method And discussion	Class performance and exams
December 1	2		Negative carbon ion reactions	Standard method And discussion	Class performance and exams
December 2	2		Negative carbon ion stability	Standard method And discussion	Class performance and exams
December 3	2		Nucleophilic substitution on a saturated carbon atom	Standard method And discussion	Class performance and exams
December 4	2		Mechanical and chemoelectric concepts	Standard method And discussion	Class performance and exams
January 1	2		structure effect, Solvent, input group	Standard method And discussion	Class performance and exams
January 2	2		Monthly exam	Standard method And discussion	Class performance and exams
January 3	2		Spring break	———	———

January 4	2		Spring break		
February 1	2		elemention reactions Mechanical E1,E2,E1CB	Standard method And discussion	Class performance and exams
February 1	2		Effect of the activating group on the mechanics of elemention	Standard method And discussion	Class performance and exams
February 1	2		Free radicals	Standard method And discussion	Class performance and exams
February 1	2		Free radical reactions	Standard method And discussion	Class performance and exams
March 1	2		Polynucleular aromatic compounds	Standard method And discussion	Class performance and exams
March 2	2		Naphthalene and substitution reactions	Standard method And discussion	Class performance and exams
March 3	2		Anthracene and phenanthrene	Standard method And discussion	Class performance and exams
March 4	2		Heterocyclic compounds	Standard method And discussion	Class performance and exams
April 1	2		Electrophilic substitution of heterocyclic compounds	Standard method And discussion	Class performance and exams
April 2	2		Monthly exam	Standard method And discussion	Class performance and exams
April 3	2		Pyridine - its preparation and reactions	Standard method And discussion	Class performance and exams
April 4	2		Stability of the pyridine ring	Standard method And discussion	Class performance and exams
May 1	2		Quinoline preparation methods	Standard method And discussion	Class performance and exams
May 2	2		Stability of the quinoline ring	Standard method And discussion	Class performance and exams
May 3	2		substitution reaction of quinoline	Standard method And discussion	Class performance and exams

11. Course Evaluation	
3- Formative evaluation through daily exams, observing the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 20% of the total. 4- Diagnostic evaluation by semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) semester exams during the year, that is, two exams for each semester, to extract the annual quest before entering the final exams.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1-Organic Chemistry ,R. T. Morrison and R.N. Boyd, 6thEdition, Prentice – Hall. Englewood Cliffs, New Jersey 07632 (1992).
Main references (sources)	2-Advanced Organic Chemistry , Fawzi Hameed Jumaa, 1 st Edu. Althakera for publishing and distribution (2022). 3-Guide to the mechanics of organic reactions, Peter Sykes - translated by Dr. Fadel Suleiman Kammouna and Dr. Adeed Yusuf Miri, Deposit No. 321 in the National Library in Baghdad for the year 1984, Basra University Press (1984).
Recommended books and references (scientific journals, reports ...)	Access to everything that is current and published in peer-reviewed scientific journals
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course description form

1. Course name					
College of Education for Girls - Department of Chemistry					
2. Course code					
Teaching methods					
3. Semester/year					
Annual					
4. The date this description was prepared					
18/9/2025					
5. Available forms of attendance					
Theoretical					
6. Number of study hours (total) / number of units (total)					
90					
7. Name of the course administrator (if more than one name is mentioned)					
Name: M. Intisar Modheher Khairo Email: intisar.modheher@tu.edu.iq					
8. Course objectives					
- Providing students with theoretical information on how to deliver the lesson. - Teaching female students basic sciences. - Providing students with practical and theoretical scientific information.				Objectives of the study subject	
9. Teaching and learning strategies					
				Active learning strategies	
10. Course structure					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Daily exams with multiple choice questions	Discussion method	Introduction to teaching methods	The nature of teaching The concept of teaching method Advantages of a good teaching method Reasons for multiple teaching methods	3	The first week
Oral and written exam	Elocution	Educational goals	Sources for deriving educational objectives Types of educational objectives General goals Importance Behavioral goals	3	second week

			Domains		
Oral and written exam	Interrogation method	Teaching planning	Reasons for planning Some objections to planning Basic principles of planning Types of teaching plans	3	the third week
Oral and written exam	How to deliver information to students	Teaching methods	elocution Interrogation method Discussion method	3	fourth week
Oral and written exam	How to deliver information to students	Teaching methods	Extrapolation method Conclusion method Method of solving problems Programmed teaching method Project method Exploration method Concept mapping method	3	The fifth week
Written exam	How does the student deal with the event?	Current events	Selection criteria Methods of using it	3	the sixth week
Written exam	How does the student deal with the event?	Current events	The role of students in selecting and using it	3	The seventh week

11. Course evaluation	
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.	
12. Learning and teaching resources	
Teaching methods subject/chemistry department	Required textbooks (methodology, if any)
Hassan Al-Sayyid Shehata, Egyptian Lebanese Publishing House, first edition, Cairo 2008	Main references (sources)
Effat Mustafa Al-Sanawi - Methods of learning, teaching and learning and their applications in educational research, Anglo-Egyptian Journal, 1st edition, Cairo 2002	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, Internet sites

Course Description Form

1. Course Name:	
Biochemistry Laboratory / Third Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Aya Jasim Mohammed Email: aya.mohammed@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	3	Presentation method Discussion method	Carbohydrate , Molisch's test	Standard method, practical method	Grades and exams
October 2	3	Presentation method Discussion method	Benedict test	Standard method, practical method	Grades and exams
October 3	3	Presentation method Discussion method	Barfoed test	Standard method, practical method	Grades and exams
October 4	3	Presentation method Discussion method	Seliwanoff's test	Standard method, practical method	Grades and exams
November1	3	Presentation method Discussion method	Bial's test	Standard method, practical method	Grades and exams
November2	3	Presentation method Discussion method	Osazone Crystal test	Standard method, practical method	Grades and exams
November3	3	Presentation method Discussion method	Fehling test	Standard method, practical method	Grades and exams
November4	3	Presentation method Discussion method	Hydrolysis of disaccharides by acid, their detection, and comparison with monosaccharides.	Standard method, practical method	Grades and exams
December1	3	Presentation method Discussion method	Detection of polysaccharides , Acid hydrolysis of starch	Standard method, practical method	Grades and exams
December 2	3	Presentation method Discussion method	Identification of an unknown carbohydrate	Standard method, practical method	Grades and exams
December 3	3	Presentation method Discussion method	Lipids , Solubility of lipids	Standard method, practical method	Grades and exams

December 4	3	Presentation method Discussion method	Saponification value of fat	Standard method, practical method	Grades and exams
January 1	3	Presentation method Discussion method	Detection of saturated and unsaturated fatty acids	Standard method, practical method Standard method, practical method	Grades and exams
January 2	3	Presentation method Discussion method	Acrolein test	Standard method, practical method	Grades and exams
January 3	3	Presentation method Discussion method	Estimation of blood cholesterol	Standard method, practical method	Grades and exams
January 4	3	Presentation method Discussion method	First semester exam	Standard method, practical method	Grades and exams
February 1	3	Presentation method Discussion method	Proteins , Biuret test	Standard method, practical method	Grades and exams
February 2	3	Presentation method Discussion method	Ninhydrin test , Millons test	Standard method, practical method	Grades and exams
March 1	3	Presentation method Discussion method	Sakaguchi test , Xanthoproteic test	Standard method, practical method	Grades and exams
March 2	3	Presentation method Discussion method	Hopkin's – Cole test , Alkali labile sulfur test	Standard method, practical method	Grades and exams
March 3	3	Presentation method Discussion method	Precipitation by heavy metals , precipitation by acidic reagents	Standard method, practical method	Grades and exams
March 4	3	Presentation method Discussion method	Precipitation of proteins at their isoelectric point, precipitation by salting out	Standard method, practical method	Grades and exams
April 1	3	Presentation method Discussion method	Vitamins, determination of vitamin C in foods, determination of vitamin A in some food materials	Standard method, practical method	Grades and exams
April 2	3	Presentation method	Enzymes, detection of enzyme activity	Standard method, practical method	Grades and exams

		Discussion method			
April 3	3	Presentation method Discussion method	Detection of catalase enzyme activity	Standard method, practical method	Grades and exams Grades and exams
April 4	3	Presentation method Discussion method	Effect of temperature on the enzymatic reaction	Standard method, practical method	Grades and exams
May 1	3	Presentation method Discussion method	Effect of pH on the enzymatic reaction	Standard method, practical method	Grades and exams
May 2	3	Presentation method Discussion method	Detection of the chemical nature of the substance that makes up the enzyme	Standard method, practical method	Grades and exams
May 3			Second semester exam		
May 4			General review	Problem-solving method	
May 15			Final exams		

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Biochemistry (Dr. Qusay Abdulqader Al-Jalabi)
Main references (sources)	Introduction to Biochemistry (Dr. Khawla Ahmed Al-Falih)
Recommended supplementary books and references (scientific journals, reports...)	Biochemistry (Dr. Talal Saeed Al-Najafi)
Electronic references, internet sites	

Course Description Form

1. Course Name:	
Quantum and Spectra/ 4th year	
2. Course Code:	
3. Semester / Year:	
Annual / 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours per year / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asya Akbar Tawfiq Email: asya.akbar@tu.edu.iq	
8. Course objectives	
Course Objectives	_ To enable students to gain a comprehensive understanding of the fundamental principles of quantum chemistry and spectroscopy, as they represent essential branches of physical chemistry. _ To enhance students' awareness of the scope and significance of chemistry as a scientific discipline, equipping them with both theoretical and practical skills, and preparing them to teach chemistry effectively in academic institutions. _ To develop students' competencies by familiarizing them with the key scientific concepts and principles necessary to comprehend the relationship between chemical reactions from both theoretical and experimental perspectives.
9. Teaching and Learning Strategies	
Strategy	1. Standard method (lectures). 2. Discussion and Questioning method. 3. Solving problems method. 4. Brainstorming method.

10. Course Structure					
The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Oct. 1	2		Fundamentals of Quantum Mechanics	Standard Method & Discussion	Class Performance & Exams
Oct. 2	2		Failures of Classical Physics	Standard Method & Discussion	Class Performance & Exams
Oct. 3	2		Blackbody Radiation Heat Capacities	Standard Method & Discussion	Class Performance & Exams
Oct. 4	2		Photoelectric Effect Atomic and Molecular Spectra	Standard Method & Discussion	Class Performance & Exams
Nov. 1	2		Evolution of the Atomic Concept	Standard Method & Discussion	Class Performance & Exams
Nov. 2	2		Schrödinger Equation	Standard Method & Discussion	Class Performance & Exams
Nov. 3	2		Born Interpretation of the Wave Function	Standard Method & Discussion	Class Performance & Exams
Nov. 4	2		Principles of Quantum Mechanics	Standard Method & Discussion	Class Performance & Exams
Dec. 1	2		Uncertainty Principle	Standard Method & Discussion	Class Performance & Exams
Dec. 2	2		Applications of Quantum Mechanics	Standard Method & Discussion	Class Performance & Exams
Dec. 3	2		Translational Motion	Standard Method & Discussion	Class Performance & Exams
Dec. 4	2		Rotational Motion	Standard Method & Discussion	Class Performance & Exams
Jan. 1	2		Vibrational Motion	Standard Method & Discussion	Class Performance & Exams
	- Examination			Exam -	Exam
Jan.3	Spring holiday				
Jan.4	Spring holiday				
	Feb.1		Introduction to spectrum	Examination Standard and discussion method	Class performance and exams

Feb.2	2		Electromagnetic spectrum	Standard and discussion method	Class performance and exams
Feb.3	2		Microwave Spectroscopy	Standard and discussion method	Class performance and exams
Feb.4	2		Infrared spectroscopy	Standard and discussion method	Class performance and exams
Mar.1	Student trainees at schools				
Mar.2	Student trainees at schools				
Mar.3	Student trainees at schools				
Mar.4	Student trainees at schools				
Apr.1	Student trainees at schools				
Apr.2	Student application in schools				
Apr.3	2		Raman spectroscopy	Standard and discussion method	Class performance and exams
Apr.4	2		Electronic Spectra	Standard and discussion method	Class performance and exams
May1	2		Nuclear magnetic resonance	Standard and discussion method	Class performance and exams
May2	Exame				
May3	Final exams				
May4					

11. Course evaluation	
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	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	Muthanna Abdul-Jabbar Shanshal, Introduction to Quantum Mechanics. Laila Muhammad Najib, The Spectrum, University of Mosul, 1985
Main references (sources)	Thomas Engel, Quantum Chemistry & Spectroscopy, 2013, 3rd ed. Pearson Education, Inc. Glenview, USA, p 113-120. Peter Atkins, Julio de Paula, ATKINS PHYSICAL CHEMISTRY, 8th Ed., W. H. Freeman and Company, N. Y., 2006, p 290-295.
Recommended supporting books and references (scientific journals, reports....)	View all the latest information published in peer-reviewed scientific journals
Electronic references, internet sites	https://scholar.google.com https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name	
Optional /Heterogeneous Loops / Fourth Stage	
2. Course Code	
3. Semester/Year	
annual	
4. Date of preparation of this description	
18/9/2025	
5. Available Attendance Forms	
Lectures in person and electronic classes (Classroom)	
6. Number of credit hours (total) / number of units (total)	
60 hours / 2 units	
7. Course administrator's name (if more than one name is mentioned)	
Name: Dr. Ban Dawood Saleh Email:baan.saleh@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the conversation and developing their ability to distinguish between the main and secondary ideas. 2- Urging students to obtain knowledge, information and the ability to draw conclusions. 3- Develop their abilities to make quick and comprehensive summaries of the aspects of the topic.
9. Teaching and learning strategies	
Strategy can be defined as a set of general rules and outlines that are concerned with the means of achieving the desired goals of teaching and refer to the methods and plans followed by faculty members to reach the learning goals.	

10. Course Structure					
The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
October 1	2	Diction method Discussion method	Introduction to heterocyclic compounds	Standard method, practical method	Classroom performance and exams
October 2	2	Diction method Discussion method	Triple heterocyclic compounds	Standard method, practical method	Classroom performance and exams
October 3	2	Diction method Discussion method	naming tertiary heterocyclic compounds,	Standard method, practical method	Classroom performance and exams
October 4	2	Diction method Discussion method	Laboratory methods for the preparation of tertiary heterocyclic compounds	Standard method, practical method	Classroom performance and exams
November 1	2	Diction method Discussion method	Practical methods for the preparation of tertiary noncyclic compounds	Standard method, practical method	Classroom performance and exams
November 2	2	Diction method Discussion method	naming quaternary heterocyclic compounds,	Standard method, practical method	Classroom performance and exams
November 3	2	Diction method Discussion method	Laboratory methods for the preparation of tetraheteric cyclic compounds	Standard method -Practical method	Classroom performance and exams
November 4	2	Diction method Discussion method	Practical methods for the preparation of tetracyclic heterocyclic compounds	Standard method -Practical method	Classroom performance and exams
December 1	2	Diction method Discussion method	Penta-heterocyclic compounds	Standard method, practical method	Classroom performance and exams
December 2	2	Diction method Discussion method	naming penta-heterocyclic compounds,	Standard method	Classroom performance and exams
December3	2	Diction method Discussion method	Laboratory methods for the preparation of	Standard method	Classroom performance and exams

			penta-heterocyclic compounds		
December 4	2	Diction method Discussion method	Practical methods of preparation of penta-heterocyclic compounds	Standard method	Classroom performance and exams
January 1	2	Diction method Discussion method	Heterocyclic hexagonal compounds	Standard method	Classroom performance and exams
January 2	2	Diction method Discussion method	naming heterocyclic hexagonal compounds,	Standard method	Classroom performance and exams
January 3	2	Diction method Discussion method	Laboratory methods for the preparation of heterocyclic hexagonal compounds	Standard method	Classroom performance and exams
January 4	2	/	First Semester Exam		
February 1	2	Diction method Discussion method	Practical methods for the preparation of heterocyclic hexagonal compounds	Standard method	Classroom performance and exams
February 2	2	Diction method Discussion method	Preidine and derivatives and its preparation	Standard method	Classroom performance and exams
March 1	2	Diction method Discussion method	Hexagonal rings containing an oxygen atom	Standard method	Classroom performance and exams
March 2	2	Diction method Discussion method	Hexagonal rings containing a nitrogen atom	Standard method	Classroom performance and exams
March 3	2	Diction method Discussion method	AA heterocyclic polycyclic cyclic compounds	Standard method	Classroom performance and exams

March 4	2	Diction method Discussion method	Furans and its preparation	Standard method	Classroom performance and exams
April 1	2	Diction method Discussion method	Theofen and its preparation	Standard method	Classroom performance and exams
April 2	2	Diction method Discussion method	Pyrol and its preparation	Standard method	Classroom performance and exams
April 3	2	Diction method Discussion method	Perazole and its preparation	Standard method	Classroom performance and exams

April 4	2	Diction method Discussion method	Amidazole and its preparation	Standard method	Classroom performance and exams
May 1	2	Diction method Discussion method	Oxazole and its preparation	Standard method	Classroom performance and exams
May 2	2	Diction method Discussion method	Thiazole and its preparation	Standard method	Classroom performance and exams
May 3	2		Second Semester Exam		
May 5	2		General Review	Problem solving method	
May 15			Final Exams		

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily attendance, daily and monthly exams, reports... etc	
12. Learning and Teaching Resources	
Required textbooks (methodology, if any)	Nanochemistry / Department of Chemistry
Key references (sources)	AbstractIn this paper number of some dichalcones (1-6) were prepared by reaction of one mole of acetone with two moles of benzaldehyde and benzaldehydes substituted (2-methoxy, 4-methoxy, 3, 4-dimethoxy, 2-chloro and 4-nitro) in the presence of (10%) sodium hydroxide as a base. Pyrazolones (7-12) were prepared from the reaction of dichalcones (1-6) with acetic hydrazide in the presence of (45%) sodium hydroxide as a base. Isooxazoline (13-18) were prepared from the reaction of dichalcones (1-6) with hydroxyl amine hydrochloride in the presence of (10%) sodium hydroxide as a base. These compound were studied and identified by physical and spectral methods.
Recommended supporting books and references (scientific journals, reports...)	
Electronic references, websites	

Course Description Form

1. Course Name:	
Biochemistry	
2. Course Code : KH	
3. Semester / Year:	
(Fourth) 2025-2026	
4. Date this description was prepared	
18/9/2025	
5. forms of attendance available	
In – person class in addition to the class for support class by used googleclass room /	
6. Number of study hours (total) / Number of units (total)	
2 hours per week / 4 unite	
7.Name the course administrator, if more than one name	
Asra'a Ismail Yaseen Altaii Email: altaiiasr@tu.edu.iq	
Subject Objectives	- Enabling female students to reach higher levels of scientific and laboratory knowledge of life chemistry reactions. - Enabling female students to obtain the principles of the laws of biochemistry and their applications. - Students obtain knowledge of the mechanism of analysis of life compounds. - The ability to understand metabolic pathways, separate them, analyze and interpret them. - Developing thinking and research skills into life compounds and their importance in healthy human life - Effective contribution and use of modern technology in understanding metabolic pathways through advanced means. - Using e-learning and accessing the best electronic means and programs to consolidate theoretical and practical scientific material

9. Teaching and Learning Strategies

Strategy	Using teaching methods through: 1- Providing female students with the basics of pure theoretical sciences through methodological theoretical lectures. (Recitation methods) 2- Developing students' ability to analyze and discuss results through discussion circles. 3- Providing female students with the principles of scientific research through scientific laboratories to perform various experiments. ((Methods of solving problems)) 4- Building the student's scientific personality by encouraging them to give seminars and participate in student conferences. (Deductive methods) 5- Developing female students' abilities and creating electronic meetings to master the scientific subject through electronic classes
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10. Course structure: the study starts on 12/9/2023 and ends on 9/5/2024

week	W watche s	Learning outcomes required	Unit name or the topic	Method learning	Road evaluation
September 2	2	Adding learning outcomes and introducing the interactions of life compounds and their impact on the health of the organism	Bioenergetics	is a theoretical subject using standard methods, discussion,	written exams, in addition to attendance, performance, and electronic class follow-up
September 3	2	Energy structure			
September 4	2	Redox reaction			
October 1	2	metabolism			
October 2	2	Glycolysis			
October 3		Fat of pyruvate			
October 3		Crebs cycle			
October 4		Pentose ph. pathway			
November 1		Glycogenesis and glycogenlysis			
November 2		gluconeogenesis			
November 3		photosynthesis			

November 4		Metabolism of lipids			
December 1		Beta oxidation			
December 2		Fatty acids synthesis			
December 3		Cholesterol synthesis			
December 4		Ketons body			
January 1		Relation keton body with energy			
February 1		Relation metabolisim of CHO and lipid			
February 2		Digesting of protein			
February 3		Nitrogen balance			
February 4		Metabolism of amino acid			
April 2 1		Metabolism of protein			
March	Application teaching				
April 3 1		Urea cycle			
May 1		Biosynthesis of protein			
May		Genetic			

11. course evaluation

The grade is distributed out of 50% according to the tasks assigned to the student , such as daily preparation , daily exams , and oral exams..... etc
End exam by 50% , final grade of 100%.....

12. learning and teaching resources

Required ks (methodology)	Biochemistry / Talal Alnajafi
Main references (sources)	Biochemistry / Kholah Al Flaih
Scientific journals , reports.....	Basics of biochemistry / Professor Dr. Sami Al-Muzaffar Biochemistry / Khaled Al-Qaisi
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name:	
Organic synthesis / Stage Four	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Salwa Abdul Sattar Jabbar Email: s.abd@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	Infrared Spectroscopy	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Infrared Spectroscopy	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Infrared Spectroscopy	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Infrared Absorption Mechanism	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Factors Affecting Band Positions	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Active Groups and Their Appearance	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	Infrared Applications	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	NMR Spectroscopy	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Magnetic and Non-Magnetic Nuclei	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Monthly Exam	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Chemical Shift	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Factors Affecting Chemical Shift	Standard method, practical method	Grades and exams
January 1	2	Presentation method Discussion method	Unsaturated Systems	Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Band Splitting and Its Causes	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Monthly Exam	Standard method, practical method	Grades and exams
January 4		Presentation method Discussion method	Applications and Examples of NMR Spectroscopy	Standard method, practical method	Grades and exams
February 1	2	Presentation method Discussion method	Application Period	Standard method, practical method	Grades and exams

February 2	2	Presentation method Discussion method	Application Period	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method	Application Period	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	Application Period	Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method	Application Period	Standard method, practical method	Grades and exams
March 4	2	Presentation method Discussion method	Mass Spectroscopy, Ionization Process, Crushing Process, Components of Mass Spectrometer, Sample Placement Unit and Its Types	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	Different Methods of Ionization Process, Crushing Mechanism of Positive Ions	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Chemical Ionization and , Ionization by Electric Field Separation or Sorting Unit Ions	Standard method, practical method	Grades and exams
April 3	2	Presentation method Discussion method	Separation or Sorting Unit Ions	Standard method, practical method	Grades and exams
April 4	2	Presentation method Discussion method	Chemical ionization and , ionization by an electric field	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	Ion separation or sorting unit	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Measurement and detection methods	Standard method, practical method	Grades and exams
May 3,4	2	Presentation method Discussion method			

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Chemistry of Transition Elements / Chemistry Department
Main references (sources)	Spectrometric identification of organic 1 compounds by Robert M. Silverstein , Francis X . Webster and David J.Kiemle , 7 th (2005).
Recommended supplementary books and references (scientific journals, reports...)	Structure Determination of Organic Compounds by E. Pretsch, P. Buhlmann, and C. Affolter , (2000)
Electronic references, internet sites	1- Silverstein , Francis X . Webster and David J.Kiemle , 7 th (2005).

Course Description Form

1. Course Name: Indesterial Chemistry - Fourth Stage	
2. Course Code:	
3. Semester / Year: Course for the academic year 2025-2026	
4. Description Preparation Date: 18/9/2024	
5. Available Attendance Forms:	
Class attendance + electronic classes on the Google Classroom platform will be a supporting class for the in-person class and according to the controls and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Eman Ayob Yass	
Email: emanaywb@tu.edu.ig	
8. Course Objectives	
Course Objectives • Developing students' ability by identifying the most important scientific concepts and rules that must be followed by students to complete scientific research. • Urging students to obtain knowledge, information and the ability to draw conclusions. • Preparing students to practice the teaching profession and knowing how to write scientific research.	• • •
9. Teaching and Learning Strategies	
Strategy	1. The standard method (giving lectures). 2. The method of discussion and interrogation. 3. Method of solving problems. 4. Brainstorming method.

10. Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
September 3	2		Petrochemicals	Standard method And discussion	Class performance and exams
September 4	2		Oil origin	Standard method And discussion	Class performance and exams
October 1	2		Its nature and classification	Standard method And discussion	Class performance and exams
October 2	2		Crude oil evaluation	Standard method And discussion	Class performance and exams
October 3	2		Thermal solution of alkenes	Standard method And discussion	Class performance and exams
October 4	2		Monthly exam	Standard method And discussion	Class performance and exams
November 1	2		Aromatic compounds	Standard method And discussion	Class performance and exams
November 2	2		Oxidation in petrochemical industries	Standard method And discussion	Class performance and exams
November 3	2		Halogen compounds	Standard method And discussion	Class performance and exams
November 4	2		Corrosion in chemical industries	Standard method And discussion	Class performance and exams
December1	2		Factors affecting the chemical industries	Standard method And discussion	Class performance and exams
December2	2		Monthly exam	Standard method And discussion	Class performance and exams
December3	2		Water treatment for industrial purposes	Standard method And discussion	Class performance and exams
December4	2		Industrial pollution	Standard method And discussion	Class performance and exams
January1	2		Industrial pollution of water, air and land	Standard method And discussion	Class performance and exams

January2	2		Cement industry	Standard method And discussion	Class performance and exams
January3 January4	2		Pesticides and fertilizers industry	-----	-----
	2		Monthly exam	-----	-----
February 1	2		Spring break	Standard method And discussion	Class performance and exams
February 1	2		Spring break	Standard method And discussion	Class performance and exams
February 1	2		Pesticides and fertilizers industry	Standard method And discussion	Class performance and exams
February 1	2		Raw materials, their specifications and uses	Standard method And discussion	Class performance and exams
March 1	2		Benefits of fertilizers and pesticides	Standard method And discussion	Class performance and exams
March 2	2		Pesticides and fertilizers industry	Standard method And discussion	Class performance and exams
March 3	2		Paper Industry	Standard method And discussion	Class performance and exams
March 4	2		School application	Standard method And discussion	Class performance and exams
April 1	2		School application	Standard method And discussion	Class performance and exams
April 2	2		School application	Standard method And discussion	Class performance and exams
April 3	2		School application	Standard method And discussion	Class performance and exams
April 4	2		School application	Standard method And discussion	Class performance and exams
Mays1	2		Sulfur industries	Standard method And discussion	Class performance and exams
Mays 2	2		Perfumes	Standard method And discussion	Class performance and exams
Mays 3	2		Final practical exam	Standard method And discussion	Class performance and exams

11. course evaluation

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

12. learning and teaching resources

Required ks (methodology)	
Main references (sources)	
Scientific journals , reports.....	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Practical diagnosis / Stage Four	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
180 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Hachim Sultan Email: aSultan@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure					
Week	Hours	Required learning outcomes	Preliminary synthesis	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	Solubility	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Sodium melting	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Sodium melting and melting point determination	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Double bond detection	Standard method, practical method	Grades and exams
November 1	2	Presentation method Discussion method	Aldehydes and ketones detection and differentiation	Standard method, practical method	Grades and exams
November 2	2	Presentation method Discussion method	Monthly exam with submission of first report	Standard method, practical method	Grades and exams
November 3	2	Presentation method Discussion method	Detection of esters, anhydrides and tannins	Standard method, practical method	Grades and exams
November 4	2	Presentation method Discussion method	Detection of carboxylic acids, amines and phenols	Standard method, practical method	Grades and exams
December 1	2	Presentation method Discussion method	Monthly exam with submission of second report	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Preparation of organic derivatives	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Infrared spectrum analysis	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Reading the ranges of active groups in organic compounds	Standard method, practical method	Grades and exams
January 1	2	Presentation method Discussion method	Reading the ranges of active groups in substituted compounds	Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Monthly exam with submission of third report	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Infrared spectrum applications and examples	Standard method, practical method	Grades and exams
January 4		Presentation method Discussion method	NMR spectrum applications and examples	Standard method, practical method	Grades and exams
February 1	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams

March 1	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams
March 4	2	Presentation method Discussion method	Application period	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	Unknown diagnosis No. 1	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Unknown diagnosis No. 1 and submission of report	Standard method, practical method	Grades and exams
April 3	2	Presentation method Discussion metho	Unknown diagnosis No. 2	Standard method, practical method	Grades and exams Grades and exams
April 4	2	Presentation method Discussion method	Unknown diagnosis No. 2 And submitting the anonymous diagnosis	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	And submitting the anonymous diagnosis report No. 3 and submitting the monthly	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	exam report with the submission of the fourth report	Standard method, practical method	Grades and exams
May 3,4	2	Presentation method Discussion method	exam report with the submission of the fourth report		

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Chemistry of Transition Elements / Chemistry Department
Main references (sources)	Spectrometric identification of organic 1 compounds by Robert M. Silverstein , Francis X . Webster and David J.Kiemle , 7 th (2005).
Recommended supplementary books and references (scientific journals, reports...)	Structure Determination of Organic Compounds by E. Pretsch, P. Buhlmann, and C. Affolter , (2000)
Electronic references, internet sites	1- Silverstein , Francis X . Webster and David J.Kiemle , 7 th (2005).

Course Description Form

1. Course Name:	
Industrial Chemistry / Four Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: MSc.Aya Ibrahim Ali Email: Aya.Ibrahim@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	3	Presentation method Discussion method	Soap Preparation	Standard method, practical method	Grades and exams
October 2	3	Presentation method Discussion method	Soap Preparation	Standard method, practical method	Grades and exams
October 3	3	Presentation method Discussion method	Extraction of edible oils	Standard method, practical method	Grades and exams
October 4	3	Presentation method Discussion method	Extraction of edible oils	Standard method, practical method	Grades and exams
November1	3	Presentation method Discussion method	Separation of n-paraffin	Standard method, practical method	Grades and exams
November2	3	Presentation method Discussion method	Separation of n-paraffin	Standard method, practical method	Grades and exams
November3	3	Presentation method Discussion method	Preparation of tooth paste	Standard method, practical method	Grades and exams
November4	3	Presentation method Discussion method	Preparation of tooth paste	Standard method, practical method	Grades and exams
December1	3	Presentation method Discussion method	Preparation of cellulose tertiary and secondary acetates	Standard method, practical method	Grades and exams
December 2	3	Presentation method Discussion method	Preparation of cellulose tertiary and secondary acetates	Standard method, practical method	Grades and exams
December 3	3	Presentation method Discussion method	Preparation of resin phenol formaldehyde	Standard method, practical method	Grades and exams
December 4	3	Presentation method Discussion method	Preparation of resin phenol formaldehyde	Standard method, practical method	Grades and exams
January 1	3	Presentation method Discussion method	Preparation of phthalic alkyd resin	Standard method, practical method	Grades and exams
January 2	3	Presentation method Discussion method	Preparation of phthalic alkyd resin	Standard method, practical method	Grades and exams
January 3	3	Presentation method Discussion method	adhesives	Standard method, practical method	Grades and exams
January 4			First Semester Exams		
February 1	3	Presentation method Discussion method	adhesives	Standard method, practical method	Grades and exams
February 2	3	Presentation method Discussion method	Preparation of ammonium sulfate	Standard method, practical method	Grades and exams
March 1	3	Presentation method Discussion method	Calculating the percentage of free fatty acids in oils	Standard method, practical method	Grades and exams
March 2	3	Presentation method Discussion method	Calculating the percentage of free fatty acids in oils	Standard method, practical method	Grades and exams
March 3	3	Presentation method Discussion method	Calculating the percentage of free fatty acids in soap	Standard method, practical method	Grades and exams
March 4	3	Presentation method Discussion method	Calculating the percentage of free fatty acids in soap	Standard method, practical method	Grades and exams

April 1	3	Presentation method Discussion method	Calculating the percentage of free soada in soap	Standard method, practical method	Grades and exams
April 2	3	Presentation method Discussion method	Calculating the percentage of free soada in soap	Standard method, practical method	Grades and exams
April 3	3	Presentation method Discussion method	Preparation of Phenolphthalin Indicator	Standard method, practical method	Grades and exams
April 4	3	Presentation method Discussion method	Preparation of Phenolphthalin Indicator	Standard method, practical method	Grades and exams
May 1	3	Presentation method Discussion method	Preparation of indeco dyes	Standard method, practical method	Grades and exams
May 2	3	Presentation method Discussion method	Preparation of azo dyes	Standard method, practical method	Grades and exams
May 3	3	Presentation method Discussion method	Dyeing of fibers	Standard method, practical method	Grades and exams
May 4			Second semester exam		
May 15			Final exams		

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Industrial Chemistry / Chemistry Department
Main references (sources)	
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course description form

1. Course name					
Measurement and evaluation for the fourth stage					
2. Course code					
3. Semester/year					
Year 2025-2026					
4. The date this description was prepared					
18/9/2025					
5. Available forms of attendance					
Attend my class + electronic class on Google class room will be a supporting class for the in-person class according to the controls and instructions of the Ministry of Higher Education and Scientific Research.					
6. Number of study hours (total) / number of units (total)					
4 hours per week = 120 hours / units 2 units					
7. Name of the course administrator (if more					
Name: M.M. Saood Rajib Hassan Email: Saood.r@tu.edu.iq					
From a name mentioned)					
8. Course objectives					
The curriculum aims to prepare students to practice the teaching profession by learning about: 1- Many concepts and terms, including measurement, testing, and evaluation. 2- Types of achievement tests, how they are formulated, and their advantages and disadvantages. 3- Providing the Ministry of Education with staff specialized in educational guidance in secondary schools.			Objectives of the study subject		
9. Teaching and learning strategies					
The standard method (giving lectures). _ Method of discussion and interrogation Method of solving problems.			The strategy		
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Class performance and exams	Discussion and questioning	An overview of the development of evaluation and measurement		2	September -3
Class performance and exams	Discussion and questioning	Concepts of evaluation, measurement, and testing and		2	September 4

		the relationship between them			
Class performance and exams	Discussion and questioning	The importance of evaluation and measurement in the educational process		2	October-1
Class performance and exams	Discussion and questioning	Types of educational calendar		2	October-2
Class performance and exams	Discussion and questioning	An overview of the development of evaluation and measurement		2	October-3
Class performance and exams	Discussion and questioning	Types of educational calendar		2	October-4
Class performance and exams	Discussion and questioning	Achievement tests set by the teacher		2	November 1
Class performance and exams	Discussion and questioning	Test map		2	November 2
Class performance and exams	Discussion and questioning	Essay tests		2	November 3
Class performance and exams	Discussion and questioning	Short answer tests		2	November 4
Class performance and exams	Discussion and questioning	Performance tests		2	December 1
Class performance and exams	Discussion and questioning	Objective tests		2	December 2
Class performance and exams	Discussion and questioning	Objective tests		2	December 3
Class performance and exams	Discussion and questioning	Analyze and improve test items		2	December 4
2					January 1
		Spring break from 1/14/2024 until 1/28/2024			January 2
Class performance and exams	Discussion and questioning	Ease factor		2	February 1
2					February 2

Class performance and exams	Discussion and questioning	Discrimination coefficient		2	February 3
Class performance and exams	Discussion and questioning	Good test specifications		2	February 4
Class performance and exams	Discussion and questioning	Consistency		2	April 3
Class performance and exams	Discussion and questioning	Objectivity and comprehensiveness		2	April 4
Class performance and exams	Discussion and questioning	Improving some non-test evaluation methods		2	Mays1

11. Course evaluation	
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. The degree is distributed through several channels: 1- Formative (formative) assessment through daily exams, observing and following up on the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 20% of the total. 2- Diagnostic evaluation of the semester and final exams to issue judgments of success and failure. This grade is 80% and is divided into (4) exams for each semester, two exams, to extract the annual endeavor before entering the final exams.	
12. Learning and teaching resources	
Evaluation and Measurement, written by Mustafa Mahmoud Al-Imam and others.	Required textbooks (methodology, if any)
- Evaluation and measurement in education and psychology, Sami Melhem, 2000. 2- Measurement and Evaluation in Education, Touma George Al-Khoury, 2008. 3- Educational measurement and evaluation in the teaching process, Salah El-Din Mahmoud Allam, 2007.	Main references (sources)
Access to everything recent and published in peer-reviewed scientific journals	Recommended supporting books and references (scientific journals, reports...)
http://www.alkutubcafe.com/book/83rjar.html	Electronic references, Internet sites

Course Description Form

1. Course Name:	
Industry of Chemistry / third Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 7 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. MOHAMMED GAZEE ABED ALKAREEM Email: mgchemo@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure

Week	Hours	Required learning outcomes		Learning method	Evaluation method
October 1	2	Presentation method Discussion method	Introduction of polymer	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Process of polymers	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	Molecular of polymers	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Kinds of polymers	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Solid of polymers	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Flexible of polymers	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	Exam 1	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	Nomenclature of polymers	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Polymerization	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Mechanism of polymers	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Additives to polymers	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Ionic addition	Standard method, practical method	Grades and exams
January 1	2	Presentation method Discussion method	Ionic mechanism	Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Inonic polmeraization	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Free radical	Standard method, practical method	Grades and exams
January 4			Condensation POLYMER		
February 1	2	Presentation method Discussion method	Exam	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Plastic	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method	Industry of rubber	Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method	Vulcanization	Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method	Vibers	Standard method, practical method	Grades and exams
March 4	2	Presentation method Discussion method	Analyses of polymers	Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method	Spectrum of polymers	Standard method, practical method	Grades and exams
April 2	2	Presentation method Discussion method	Exam	Standard method, practical method	Grades and exams
April 3	2	Presentation method Discussion method	Test of distinguish	Standard method, practical method	Grades and exams

April 4	2	Presentation method Discussion method	X ray of polymers	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	Thermal analyses	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Physical properties	Standard method, practical method	Grades and exams
May 3			Exam 4		
May 4			General review	Problem-solving method	
May 15					

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Foundations of organic chemistry
Main references (sources)	Morisson and boyd
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course Description Form

1. Course Name:	
Instrumental of Chemical Analysis / Fourth Stage	
2. Course Code	
3. Semester / Year	
Annual/ 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures , online classes (Classroom) and practical in lab.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
180 hours / 9 units	
7. Course administrator's name (mention all, if more than one name)	
Name: prof. Dr. Mohsin Hamza Bakir Email: dr.mhb@tu.edu.iq	
8. Course Objectives	
Course Objectives	1- Developing students' ability to follow and understand the discourse and enhance their ability to distinguish between main and secondary ideas. 2- Encouraging students to acquire knowledge and information and the ability to draw conclusions. 3- Developing their abilities to create quick and comprehensive summaries of the topic.
9-Teaching and Learning Strategies	
A strategy can be defined as a set of general rules and guidelines that focus on the means of achieving the desired teaching objectives and refer to the methods and plans followed by faculty members to achieve learning goals.	

10- Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	2	Presentation method Discussion method	Instrumental Analysis: Introduction	Standard method, practical method	Grades and exams
October 2	2	Presentation method Discussion method	Electromagnetic Radiation , Regions, Interaction with matter	Standard method, practical method	Grades and exams
October 3	2	Presentation method Discussion method	UV-Vis. Absorption Spectrophotometry: Principles	Standard method, practical method	Grades and exams
October 4	2	Presentation method Discussion method	Instrumentations	Standard method, practical method	Grades and exams
November1	2	Presentation method Discussion method	Applications	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Turbidimetry and Nephelometry	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	IR, Applications	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	1 st Exam	Standard method, practical method	Grades and exams
December1	2	Presentation method Discussion method	Atomic Spectrophotometry (Absorption and Emission)	Standard method, practical method	Grades and exams
December 2	2	Presentation method Discussion method	Electroanalytical Methods: principles	Standard method, practical method	Grades and exams
December 3	2	Presentation method Discussion method	Potentiometry: principles and requirements	Standard method, practical method	Grades and exams
December 4	2	Presentation method Discussion method	Ion Selective Electrodes: principles and types	Standard method, practical method	Grades and exams
January 1	2	Presentation method Discussion method	Voltammetry & Polarography	Standard method, practical method	Grades and exams
January 2	2	Presentation method Discussion method	Principles, Kinds, and requirements	Standard method, practical method	Grades and exams
January 3	2	Presentation method Discussion method	Qualitative & Quantitative analysis	Standard method, practical method	Grades and exams
January 4			First Semester Exams		
February 1	2	Presentation method Discussion method	First Semester Exams	Standard method, practical method	Grades and exams
February 2	2	Presentation method Discussion method	Coloumetry: principles and requirements	Standard method, practical method	Grades and exams
March 1	2	Presentation method Discussion method		Standard method, practical method	Grades and exams
March 2	2	Presentation method Discussion method		Standard method, practical method	Grades and exams
March 3	2	Presentation method Discussion method		Standard method, practical method	Grades and exams
March 4	2	Presentation method Discussion method		Standard method, practical method	Grades and exams
April 1	2	Presentation method Discussion method		Standard method, practical method	Grades and exams

April 2	2	Presentation method Discussion method		Standard method, practical method	Grades and exams
April 3	2	Presentation method Discussion method	Coloumetric Titrations	Standard method, practical method	Grades and exams
April 4	2	Presentation method Discussion method	Conductivity Measurements	Standard method, practical method	Grades and exams
May 1	2	Presentation method Discussion method	Thermal methods: principles	Standard method, practical method	Grades and exams
May 2	2	Presentation method Discussion method	Types	Standard method, practical method	Grades and exams
May 3			Applications		
May 4			Exam	Problem-solving method	
May 15			Final exams		

11. Course Evaluation

Distribution of grades out of 100 according to tasks assigned to the student such as daily attendance, daily and monthly exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (methodology if available)	Instrumental of Chemical Analysis
Main references (sources)	التحليل الكيميائي الالي - عبد المحسن عبد الحميد الحيدري 1991
Recommended supplementary books and references (scientific journals, reports...)	Fundamentals of Analytical Chemistry, 8 th Edition, 2004 Douglas A. Skoog , Donald M. West, F. James Holler, Stanley R. Crouch Stanford University San Jose State University of Kentucky Michigan State University أسس الكيمياء التحليلية: ترجمة د. زهير متي قصير وآخرون، 1986 طرق التحليل الالي د. فتحي احمد عبيد
Electronic references, internet sites	Google scholar, Science Direct ,TMI, MSDS