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 in chemistry

Final Certificate Name: Bachelor of Education

Academic System: Annual

Description Preparation Date: 18/9/2024

File Completion Date: 18/9/2024

Signature:
Head of Department Name:
L. Dr. Ban Dawood Saleh
Date:

Signature:
Scientific Associate Name:
prof. Dr. Ashrf jamal mohamod
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. Program Vision

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	
1Learning 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. **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	**2-**Statement of Learning Outcomes Empowering students to solve problems that are relevant to their learning style in the lesson.
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		3	
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 .1 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

1- Internet research for similar experiments.
2- 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.

Program Skills Outline															
Required program Learning outcomes															
Year/ Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
			Mandatory	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
The first		Organic chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Analytical chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		mathematics	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Security and safety	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Life sciences	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Calculators	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Human rights	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Arabic	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		English language	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Inorganic chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Developmental and educational psychology	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
Second		Organic chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Inorganic chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Developmental psychology	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Physical chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Analytical chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Calculators	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Educational administration	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		mathematics	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		English language	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
Third		Organic chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Coordination chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Physical chemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Biochemistry	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Research methodology	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*
		Teaching methods	Mandatory	*	*	*	*	*	*	*	*	*	*	*	*

		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:	
Organic chemistry / 1 year	
2. Course Code:	
3. Semester / Year:	
Annual / 2024-2025	
4. Description Preparation Date:	
18/9/2024	
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)	
150 hours per year / 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: **Ass. Prof. Mohammed ghazee abed-alkareem** Email: mgchemo**@tu.edu.iq**	
8. Course objectives	
Course objectives	• Providing students with knowledge of the principles of 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**
Sep. 3	4		**General properties of alkanes**	Standard and practical method	Class performance and exams
Sep. 4	4		**Synthese of alkanes**	Standard and practical method	Class performance and exams
Oct. 1	4		**Reactions of alkanes**	Standard and practical method	Class performance and exams
Oct. 2	4		**General properties of alkenes**	Standard and practical method	Class performance and exams
Oct. 3	4		**Synthese of alkenes**	Standard and practical method	Class performance and exams
Oct. 4	4		**Reactions of alkenes**	Standard and practical method	Class performance and exams
Nov. 1	4		**General properties of alkynes**	Standard and practical method	Class performance and exams
Nov. 2	4		**Synthese of alkynes**	Standard and practical method	Class performance and exams
Nov. 3	4		**Reactions of alkynes**	Standard and practical method	Class performance and exams
Nov. 4	4		**General properties of alcohol**	Standard and practical method	Class performance and exams
Des. 1	4		**Synthese of alcohol**	Standard and practical method	Class performance and exams
Des. 2	4		**Reactions of alcohol**	Standard and practical method	Class performance and exams
Des. 3	4		**Exam 1**	Standard and practical method	Class performance and exams
Des.4	4		**General properties of halide alkyl**	Standard and practical method	Class performance and exams
Jan. 1	4		**Synthese of halide alkyl**	Standard and practical method	Class performance and exams
Jan. 2	4		**Reactions of halide alkyl**	Standard and practical method	Class performance and exams

Jan/ 3	**Spring holiday**				
Jan. 4					
Feb. 1	4		**General properties of alkanes**	Standard and practical method	Class performance and exams
Feb. 2	4		**Synthese of alkanes**	Standard and practical method	Class performance and exams
Feb. 3	4		**Reactions of alkanes**	Standard and practical method	Class performance and exams
Feb. 4	4		**Exam 2**	Standard and practical method	Class performance and exams
Mar. 1	4		**General properties of alkanes**	Standard and practical method	Class performance and exams
Mar. 2	4		**Synthese of alkanes**	Standard and practical method	Class performance and exams
Mar.3	4		**Reactions of alkanes**	Standard and practical method	Class performance and exams
Mar. 4	4		**Exam 3**	Standard and practical method	Class performance and exams
Apr. 1	4		**General properties of amines**	Standard and practical method	Class performance and exams
Apr. 2	4		**Synthese of amines**	Standard and practical method	Class performance and exams
Apr. 3	4		**Reactions of amines**	Standard and practical method	Class performance and exams
Apr. 4	4		**Aromatic compounds**	Standard and practical method	Class performance and exams
May 1	4		**Exam 4**	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)	Morrison and boyd
Main references (sources)	
Recommended books and references (scientific journals, reports …)	
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. Course Name:
Chemical Safety and Security / 1st year
2. Course Code:
3. Semester / Year:
Annual / 2024-2025
4. Description Preparation Date:
18/9/2024
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)
60 hours per year / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Lecture Marwan Thaer Jalal Email: marwan.analytical@tu.edu.iq
8. Course objectives

Course objectives	• Providing students with knowledge of the principles of safety and security as 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	1	Elocution and Discussion Methods	Introduction and introduction	Standard and practical method	Class performance and exams
Sep. 4	1	Elocution and Discussion Methods	Enhancing laboratory safety and security	Standard and practical method	Class performance and exams
Oct. 1	1	Elocution and Discussion Methods	Determine the level of laboratory safety and security	Standard and practical method	Class performance and exams
Oct. 2	1	Elocution and Discussion Methods	Procedures to improve laboratory safety and security	Standard and practical method	Class performance and exams
Oct. 3	1	Elocution and Discussion Methods	Laboratory safety and security laws and legislation	Standard and practical method	Class performance and exams
Oct. 4	1	Elocution and Discussion Methods	The organizational structure of the chosen one	Standard and practical method	Class performance and exams
Nov. 1	1	Elocution and Discussion Methods	Environmental Health and Safety Office	Standard and practical method	Class performance and exams
Nov. 2	1	Elocution and Discussion Methods	University Chemical Safety and Security Committee	Standard and practical method	Class performance and exams
Nov. 3	1	Elocution and Discussion Methods	Risk management and assessment	Standard and practical method	Class performance and exams
Nov. 4	1	Elocution and Discussion Methods	Physical risk assessment	Standard and practical method	Class performance and exams
Des. 1	1	Elocution and Discussion Methods	Biological risk assessment	Standard and practical method	Class performance and exams
Des. 2	1	Elocution and Discussion Methods	Evaluating the risks of toxic and flammable materials in the laboratory	Standard and practical method	Class performance and exams

Des. 3	1	Elocution and Discussion Methods	Hierarchy of controls	Standard and practical method	Class performance and exams
Des.4	1	Elocution and Discussion Methods	Laboratory safety equipment	Standard and practical method	Class performance and exams
Jan. 1	1	Elocution and Discussion Methods	Implement laboratory safety rules and basic administrative controls	Standard and practical method	Class performance and exams
Jan. 2	1	Elocution and Discussion Methods	Implement laboratory safety rules and basic administrative controls	Standard and practical method	Class performance and exams
Jan/ 3	**Spring holiday**				
Jan. 4					
Feb. 1	1	Elocution and Discussion Methods	Establish security levels Basics of chemical	Standard and practical method	Class performance and exams
Feb. 2	1	Elocution and Discussion Methods	Establish security levels Basics of chemical	Standard and practical method	Class performance and exams
Feb. 3	1	Elocution and Discussion Methods	Basics of chemical security	Standard and practical method	Class performance and exams
Feb. 4	1	Elocution and Discussion Methods	Electronic security	Standard and practical method	Class performance and exams
Mar. 1	1	Elocution and Discussion Methods	Administrative security	Standard and practical method	Class performance and exams
Mar. 2	1	Elocution and Discussion Methods	Handling the chemical	Standard and practical method	Class performance and exams
Mar.3	1	Elocution and Discussion Methods	Working with compressed gases	Standard and practical method	Class performance and exams
Mar. 4	1	Elocution and Discussion Methods	Dealing with laboratory equipment	Standard and practical method	Class performance and exams
Apr. 1	1	Elocution and Discussion Methods	Identifying chemical waste and their risks	Standard and practical method	Class performance and exams
Apr. 2	1	Elocution and Discussion Methods	Collection and storage of chemical waste	Standard and practical method	Class performance and exams

Apr. 3	1	Elocution and Discussion Methods	Treatment and risk reduction	Standard and practical method	Class performance and exams
Apr. 4	1	Elocution and Discussion Methods	Chemical waste disposal options	Standard and practical method	Class performance and exams
May 1	1	Elocution and Discussion Methods	Emergency preparedness plan	Standard and practical method	Class performance and exams
May 2	1	Elocution and Discussion Methods	Assessing laboratory vulnerabilities	Standard and practical method	Class performance and exams
May 3	1	Elocution and Discussion Methods	Emergency training	Standard and practical method	Class performance and exams
May 4	1	Elocution and Discussion Methods	Basics of chemical security	Standard and practical method	Class performance and exams
June 1			Final 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)	Chemical Safety and Security for Undergraduate Student 2021.
Main references (sources)	1-Directions for work in chemical laboratories, Dr. Muthanna Abdul-Jabbar Shanshal, University of Baghdad - College of Science, 1983. 2-Safety in chemical laboratories, Kingdom of Saudi Arabia - General Corporation for Technical and Vocational Education 2015.

	3- Safety Guide in Chemical and Biological Laboratories and Stores at Anbar University, 2018. 4- Security and safety in the chemical laboratory (Guide for developing standard operating procedures) The National Academic of Sciences – Engineering – Medicine 2016 4-global chemical and biological security.
Recommended books and references (scientific journals, reports …)	Access to everything that is current and published in peer-reviewed scientific journals
Electronic References, Websites	**1-terial Safety Data Sheet https://www.msds.net/.** **2-sandia national laboratories https://www.sandia national lab.net/** **3-journal of transportation safety & security** **https://www.tandfonline.com/action/journalInformation?show=journalMetrics&journalCode=utss20**

Course Description Form

1. Course Name:
Analytical chemistry / 1st year
2. Course Code:
3. Semester / Year:
Annual / 2024-2025
4. Description Preparation Date:
18/9/2024
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 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

5- 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.

6- 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:
Computer (computer basics)
2. Course Code:
3. Semester / Year:
2024-2025/ First Year
4. Description Preparation Date:
18/9/2024
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/NzM0ODg4NDI4ODY3?cjc=b5vgczn
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 progra using the Windows 10 operating system, windows, icons, the mouse, and keyboard, dealing with fi computer settings, and the printer. Then the student moves on to learning to create documents us 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, etcProviding student with the skills to deal with the Internet, its most important services, computer networks, th 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.

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 Hardware and software - of use 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**	**21**
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 textbo (curricular books 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 referen (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 (AD", 1st Edition (2024).
Electronic References, Websites	• http://21za.com/computer/first_about_computer.htm • http://www.opendirectorysite.info • http://ar.wikipedia.org/wiki • http://www.vercon.sci.eg/Matrials/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: Human Rights and Democracy/ First stage/ Chemistry Department
2. Course code
3. Semester/Year 2024- 2025
4. Date of preparation of this description 9/18/2024
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.	Subject objectives

• Optimal preparation for a competent generation with a high level of knowledge about human rights and democracy.	
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	**11/30/2024** 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 Classroom performance and exams	Standard method Text method Standard method Text method	Human rights in divine laws and religions Human rights sources		**1** **1**	December (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 child rights rules		**1**	January (4)
			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 17/2/2025 and ends on Thursday 24/2/2025	**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:
Physical chemistry / 2nd year
2. Course Code:
3. Semester / Year:
Annual / 2024-2025
4. Description Preparation Date:
18/9/2024
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 / 9 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. 2	6		**General properties of gases**	Standard and practical method	Class performance and exams
Sep. 3	6		**Ideal gas laws**	Standard and practical method	Class performance and exams
Sep. 4	6		**Kinetic theory of ideal gases**	Standard and practical method	Class performance and exams
Oct. 1	6		**The First law of thermodynamics**	Standard and practical method	Class performance and exams
Oct. 2	6		**Types of thermodynamic processes**	Standard and practical method	Class performance and exams
Oct. 3	6		**Energy and enthalpy**	Standard and practical method	Class performance and exams
Oct. 4	6		**Thermochemistry**	Standard and practical method	Class performance and exams
Nov. 1	6		**Phase transition enthalpies**	Standard and practical method	Class performance and exams
Nov. 2	6		**Heat of formation**	Standard and practical method	Class performance and exams
Nov. 3	6		**Heat of combustion**	Standard and practical method	Class performance and exams
Nov. 4	6		**heat of neutralization**	Standard and practical method	Class performance and exams
Des. 1	6		**Bond energies**	Standard and practical method	Class performance and exams
Des. 2	6		**The Second law of thermodynamics**	Standard and practical method	Class performance and exams
Des. 3	6		**Entropy**	Standard and practical method	Class performance and exams
Des.4	6		**Calculate the change in entropy**	Standard and practical method	Class performance and exams

Jan. 1	6		**The Third law of thermodynamics**	Standard and practical method	Class performance and exams
Jan. 2	**Spring holiday**				
Jan. 3					
Jan. 4	6		**The Free energy**	Standard and practical method	Class performance and exams
Feb. 1	6		**Standard free energy of formation**	Standard and practical method	Class performance and exams
Feb. 2	6		**Chemical potential**	Standard and practical method	Class performance and exams
Feb. 3	6		**Chemical equilibrium**	Standard and practical method	Class performance and exams
Feb. 4	6		**Law of mass action**	Standard and practical method	Class performance and exams
Mar. 1	6		**Lee-chatelier Brown rule**	Standard and practical method	Class performance and exams
Mar. 2	6		**The equilibrium constant changes with temperature**	Standard and practical method	Class performance and exams
Mar.3	6		**Phase equilibria**	Standard and practical method	Class performance and exams
Mar. 4	6		**Uses of the phase rule**	Standard and practical method	Class performance and exams
Apr. 1	6		**Surface tension**	Standard and practical method	Class performance and exams
Apr. 2	6		**Adsorption**	Standard and practical method	Class performance and exams
Apr. 3	6		**Examples and solutions**	Standard and practical method	Class performance and exams
Apr. 4	6		**General Review**	Standard and practical method	Class performance and exams

11. Course Evaluation	
7- 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. 8- 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^{t} 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:
Inorganic Chemistry / Second Stage
2. Course Code
3. Semester / Year
Annual
4. Description Preparation Date:
18/9/2024
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**	**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

1. **Course Name: Organic Chemistry – 2nd Stage**
2. **Course Code:**
3. **Semester / Year:** Course for the academic year 2024-2025
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 Ayoob Yass **Email:** emanaywb@tu.edu.iq
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		chemical bases	Standard method And discussion	Class performance and exams
September 4	2		Aromatic comp.	Standard method And discussion	Class performance and exams
October 1	2		Benzene reactions	Standard method And discussion	Class performance and exams
October 2	2		Reactions mechanezim	Standard method And discussion	Class performance and exams
October 3	2		Ariel halides	Standard method And discussion	Class performance and exams
October 4	2		Nomanycalture of Ariel halides	Standard method And discussion	Class performance and exams
November 1	2		Reaction of Ariel halides	Standard method And discussion	Class performance and exams
November 2	2		alcoholes	Standard method And discussion	Class performance and exams
November 3	2		Monthly exam 1	Standard method And discussion	Class performance and exams
November 4	2		Preparation of alcoholes	Standard method And discussion	Class performance and exams
December1	2		Interactions of alcoholes	Standard method And discussion	Class performance and exams
December2	2		Nomanycalture of alcoholes	Standard method And discussion	Class performance and exams

December3	**2**		**Nomanycalture of Carboxylic acid**	**Standard method And discussion**	**Class performance and exams**
December4	**2**		**Preparation of Carboxylic acid**	**Standard method And discussion**	**Class performance and exams**
January1	**2**		**Interactions of Carboxylic acid**	**Standard method And discussion**	**Class performance and exams**
January2	**2**		**Mon2thly exam**	**Standard method And discussion**	**Class performance and exams**
January3	**2**		**aminns**	**----------**	**----------**
January4	**2**		**Nomanycalture of aminns**	**----------**	**---------**
February 1	**2**		**Preparation of aminns**	**Standard method And discussion**	**Class performance and exams**
February 1	**2**		**Interactions of aminns**	**Standard method And discussion**	**Class performance and exams**
February 1	**2**		**Monthly exam 3**	**Standard method And discussion**	**Class performance and exams**
February 1	**2**		**esters**	**Standard method And discussion**	**Class performance and exams**
March 1	**2**		**Interactions of ester**	**Standard method And discussion**	**Class performance and exams**
March 2	**2**		**Spring break**	**Standard method And discussion**	**Class performance and exams**
March 3	**2**		**Phenols ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
March 4	**2**		**Arens ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
April 1	**2**		**Slphonic comp. ,preparation,**	**Standard method**	**Class performance**

			Interactions	**And discussion**	**and exams**
April 2	**2**		**Nitrogen comp. ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
April 3	**2**		**Phosphor comp. ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
April 4	**2**		**Monthly exam 4**	**Standard method And discussion**	**Class performance and exams**
Mays1	**2**		**Glygols ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
Mays 2	**2**		**Aldehydes ,preparation, Interactions**	**Standard method And discussion**	**Class performance and exams**
Mays 3	**2**		**Ketons ,preparation, 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

10. Course Name:
Computer (applications)
11. Course Code:
12. Semester / Year:
2024-2025/ Second Year
13. Description Preparation Date:
18/9/2024
14. Available Attendance Forms:
Attendance
15. Number of Credit Hours (Total) / Number of Units (Total)
90 hours: 30 hours theoretical hours + 60 hours practical hours. 1 theoretical hours + 2 practic hours per week & https://classroom.google.com/c/NzEzMzg0NDI5MTY2?cjc=aeiknem
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 : • Sufficient information about Microsoft package programs, especially Word and presentations. • Developing the student's skills in dealing with computers and managing them efficiently, from theoretical clarification and practical application, which will help her in writing research projects, printing tasks, preparing statistics and graphs, creating presentations, designing explanatory graphs, e • Enabling the student to use the Internet in the fields of education, scientific research, electronic correspondence, web pages, and digital communications**.**
18. Teaching and Learning Strategies

Strategy	• Delivering lectures with practical application and training of the lecture topics and relying on approved sources. • Using modern educational teaching aids, such as educational films, blended learning and e-learning by the google classroom platform. • Self-learning method, by learner-centered approach to encourage students to take ownership of their learning, set their own goals, and adapt to new challenges. • Explanation and clarification using a data display device. • Encourage students to visit the central library of Tikrit University to improve understanding and learning. • Discussion, asking questions, dialogue, and brainstorming. • Small group education and continuous follow-up with questions. • Conduct research and reports on the subject areas of the course and discuss and also approve those reports within the evaluation.

10.Course structure

Course level : Second year

Course Name: Computer (applications)

Semester: First

Evaluation methods	Learning methods	Subjects name	Learning methods outcomes	Hours	weeks
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter One: Microsoft programs - Word	Introduction to Microsoft programs - Word (introduction - running the program - program interface - file tabulation)	3	1-2
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter One -Word	Home tab (Clipboard - Font - Paragraph - Styles and Editing)	3	3
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter One -Word	Page Layout tab (Layout - Page Setup - Background - Arrangement)	3	4
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter One -Word	Learning of ddisplay tab (document display methods - show - zoom in and out - window - instructions)	3	5
Review of the second chapter with practical application				3	6
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Two - Word	Learning of inserting objects in Microsoft Word 2010 (Insert tab - Pages and tables (Tables, Design, and Planning Tools tab)	3	7
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Two - Word	Illustrations - Image Tools tab - Links - Header and Footer	3	8
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Two - Word	Text and symbols	3	9
Review of the second chapter with practical application				3	10
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Three - Word	Additional tasks for Microsoft Word 2010 - References tab (tables of contents - footnotes - references and citations - captions - index and tables of sources)		11

Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Three – Word	Correspondence tab (create files and labels - start a mail merge - write and insert fields - preview the results - finish)	3	12-13
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Three – Word	Review tab (auditing - language - comments - tracking - changes - comparison - protection)	3	14
Review of the second chapter with practical application				3	15
First semester exam (theoretical + practical)				3	16
Mid-year holiday					
Semester: Second					
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	: Chapter Four Power Point	Introduction to Microsoft PowerPoint (running the program - the program interface)	3	19
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	: Chapter Four Power Point	File tab (open a new file - save the file - save a presentation in another format - open a stock presentation file - close the presentation - print the slides on paper)	3	20
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	: Chapter Four Power Point	Home tab (Clipboard - Slides - Font - Paragraph - Editing)	3	21
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	: Chapter Four Power Point	Design tab (page setup - theme - background)	3	22
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	: Chapter Four Power Point	Slide Show tab - Presentation tab (presentation methods - main view - show - color - grayscale - zoom in and out - window and help instructions) Power Point	3	23
Review of Chapter Four with practical application				3	24
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Five: Power Point	inserting objects and adding animations in Microsoft PowerPoint Introduction - Adding and formatting automatic shapes (drawing - editing)	3	25
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Five: Power Point	insert tabs (tables - images - illustrations - links - text - symbols - media)	3	26
Questions, discussion	Lecture and explanation	Chapter Five: Power Point	Adding movements to slides and objects (Transition tab - Preview - Move to slide - Timing)	3	27

and daily exam	(theoretical + practical)				
Questions, discussion and daily exam	Lecture and explanation (theoretical + practical)	Chapter Five: Power Point	Animations tab (Preview group - Animation group - Custom animation group - Timing group)	3	28
Review of Chapter Five with practical application				3	29
Second semester exam (theoretical + practical)				3	30

3. Course Evaluation	
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, and 50 marks for the final exams.	
4. Learning and Teaching Resources	
Required textbooks (curricu books, if any)	Computer basics and office applications, Part Two - Ministry of Higher Education and Scientific Research - Department of Research and Development. • Subject lecture's notes.
Main references (sources)	Computer Proficiency Exam Guide, Computer Center - Tikrit University. • Al-Khuzai, Wissam Ali (2023). Obtaining a Computer Driver's License Series - Part Five, Your Way to Learn Microsoft Power Point 2019, First Edition. • Microsoft PowerPoint 2010 Step by Step (448 pages; Print ISBN: 978-0-7356-2691-1), by Joyce Cox and Joan Lambert, 2.Beginning Microsoft Word 2010, by T.y Anderson, Guy Hart-Davis 3. PowerPoint 2010 Advanced Slides, Animation and Layouts. Stephen Moffat, The Mouse Training Company Personal Computer User Guide, M. Mahmoud Rihawi - Shuaa Publishing and Sciences, first edition 1998 • The Arab Encyclopedia of Computers and the Internet.
Recommended books and references (scientific journals, reports...)	
ectronic References, Websites	

Course Description Form

1. Course Name:
Analytical Chemistry
2. Course Code:
Second Year
3. Semester / Year:
Annual Course
4. Description Preparation Date:
2024/9/18
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 Yasmeen 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:	
Coordination Chemistry / Third Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
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**
November 1	**2**	**Presentation method Discussion method**	**Double electron pair**	**Standard method, practical method**	**Grades and exams**
November 2	**2**	**Presentation method Discussion method**	**Coordination numbers and their geometric shapes**	**Standard method, practical method**	**Grades and exams**
November 3	**2**	**Presentation method Discussion method**	**Types of complexes based on their charge**	**Standard method, practical method**	**Grades and exams**
November 4	**2**	**Presentation method Discussion method**	**Ligands and their types**	**Standard method, practical method**	**Grades and exams**
December 1	**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**
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	
Optional /Nano/ Third Stage	
2. Course Code	
3. Semester/Year	
annual	
4. Date of preparation of this description	
18/9/2024	
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**
December3	**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**	**Fullorin**	**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**:
Organic Chemistry - Third Stage
2. **Course Code:**
3. **Semester / Year**
Annual 2024-2025
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: 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					
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
December1	2		Negative carbon ion reactions	Standard method And discussion	Class performance and exams
December2	2		Negative carbon ion stability	Standard method And discussion	Class performance and exams
December3	2		Nucleophilic substitution on a saturated carbon atom	Standard method And discussion	Class performance and exams
December4	2		Mechanical and chemoelectric concepts	Standard method And discussion	Class performance and exams

January1	**2**		**structure effect, Solvent, input group**	**Standard method And discussion**	**Class performance and exams**
January2	**2**		**Monthly exam**	**Standard method And discussion**	**Class performance and exams**
January3	**2**		**Spring break**	**----------**	**----------**
January4	**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**		**Polynulecular 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**

Mays1	**2**		**Quinoline preparation methods**	**Standard method And discussion**	**Class performance and exams**
Mays 2	**2**		**Stability of the quinoline ring**	**Standard method And discussion**	**Class performance and exams**
Mays 3	**2**		**substitution reaction of quinoline**	**Standard method And discussion**	**Class performance and exams**

11. Course Evaluation

9- 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.

10- 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, 1st 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:
Biochemistry / third stage
2. Course Code:
3. Semester / Year:
Yearly
4. Description Preparation Date:
18/9/2024
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, 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

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:	
2024-2025/ Third Year	
22. Description Preparation Date:	
18/9/2024	
23. Available Attendance Forms:	
In-class attendance + online classes on the (Google Classroom) platform serve as a supplementary cl to the in-person session, in accordance with the regulations and guidelines of the Ministry of Hig Education and Scientific Research. **https://classroom.google.com/c/NzEzMzg0NDI5MTY2?cjc=aeiknem**	
24. Number of Credit Hours (Total) / Number of Units (Total)	
theoretical hours per week 2 / 0 hours: 30 hours theoretical hours6	
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 methodolog for data collection and analysis. • Developing students' skills in seeking scientific knowledge and utilizing modern information sourc • 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**

5.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

6. 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	
College of Education for Girls - Department of Chemistry	
2. Course code	
Teaching methods	
3. Semester/year	
Annual	
4. The date this description was prepared	
18/9/2024	
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	3	second week

			Importance Behavioral goals 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

Tikrit University	1. Educational institution
Chemistry Department/ College of Education for Girls	2. Sectionscientific/ Center
Educational guidance	3. Course Name/Code
weekly	4. Available attendance forms
annual	5. Chapter/Year
(60) hours	6. Number of study hours(kidney)
18/9/2024	7. Date this description was prepared
8. Course objectives	
Providing female students with educational and psychological knowledge and teaching them modern principles, methods and topics that educational and psychological guidance focuses on and is interested in, as well as its theories and educational applications in the learning and teaching process.	
Providing students with psychological experiences, theories, and results of local and international research and studies regarding educational and psychological guidance.	
Training students to write research and reports and summarize theoretical and applied ideas in the field of developmental psychology.	

10.Course structure					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	The week
Exam	Explanation and discussion	**Chapter One: Guidance It includes the following:** - **The meaning of educational guidance, the origin and development of guidance and its concepts, the difference between guidance and direction, justifications for guidance and its objectives** - **Guidance and Counseling Principles** - **The relationship between guidance and other sciences, fields of guidance, guidance methods (individual and group guidance)**	The student should become familiar with the meaning of educational and psychological guidance, the topics it is interested in, the difference between normality and its levels and abnormality and its levels, and how to employ guidance theories in designing preventive, therapeutic, and developmental guidance programs. She should also become familiar with the types of neurotic and mental illnesses, methods of diagnosing them, their symptoms, and how to treat them.		
		Guidance problems addressed by educational guidance			
		Guidance Foundations,It includes the following topics:			

		- **Philosophical, social, moral, psychological foundations**			
		Counseling Theories - **Psychoanalytic theory, behavioral theory, self theory, existential and humanistic theory** **Information needed for guidance** - **Importance of information, types of information, means of collecting information (cumulative record, case study, narrative record, autobiography, tests and measures, observation, interview)**			
		Guidance and counselling in school - **The guiding teacher, his duties and numbers** - **Educational guide, his functions and numbers**			

		- **Parent-Teacher Councils and their role in guidance** - **The need for guidance programs in school**			

11.Infrastructure	
Collects the required materials from different books.	1- Required textbooks
1- Educational Counselor / Hadi Mishaan Spring 2009 2- Guidance and Psychological Counseling. Zahran, Hamed Abdel Salam, 1982. 3- BatRSun, S. H., 1981, Theories of Counseling and Psychotherapy, 1st ed. 4- Mental health counseling / Sahib Abdul Marzouq, Hassan Ali Al-Sayed 2011. 5- Mental health counseling / Fahim Hussein Al-Tarihi, and Hassan Rabie Hammadi. 6- The Internet	2- Main references (sources)
Journals of Educational and Psychological Sciences	A- Recommended books and references(Scientific journals, reports, ...)
	B - Electronic references, websites...
Name: Intisar Mazhar Khairo Email:Intisar.modheher@tu.edu.iq	

Course Description Form

1. Course Name:	
Practical Coordinated Chemistry / Third Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
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	Transitional elements	Standard method, practical method	Grades and exams
October 2	3	Presentation method Discussion method	Complex preparation Hexaammine nickel (II) chloride	Standard method, practical method	Grades and exams
October 3	3	Presentation method Discussion method	Complex preparation Tetraamminecupper(II) sulphate hydrate	Standard method, practical method	Grades and exams
October 4	3	Presentation method Discussion method	Complex preparation Bis – dimethyl glyoximato nickel(II)	Standard method, practical method	Grades and exams
November1	3	Presentation method Discussion method	Complex preparation (Diiodatocupper(II	Standard method, practical method	Grades and exams
November2	3	Presentation method Discussion method	Complex preparation Cis-Potassium diaquadioxalatochromate(III) hydrate	Standard method, practical method	Grades and exams
November3	3	Presentation method Discussion method	Complex preparation Trans- Potassium diaquadioxalatochromate(III) hydrate	Standard method, practical method	Grades and exams
November4	3	Presentation method Discussion method	Complex preparation Cis-Potassium diaquadioxalatochromate(III) hydrate	Standard method, practical method	Grades and exams
December1	3	Presentation method Discussion method	Complex preparation Trans- Potassium diaquadioxalatochromate(III) hydrate	Standard method, practical method	Grades and exams
December 2	3	Presentation method Discussion method	Complex preparation Pot. Trioxalatoaluminate(III) hydrate	Standard method, practical method	Grades and exams
December 3	3	Presentation method Discussion method	First Semester Exams	Standard method, practical method	Grades and exams
December 4	3	Presentation method Discussion method	Hard acids and soft acids	Standard method, practical method	Grades and exams
January 1	3	Presentation method Discussion method	Complex preparation Tri thioureacupper(I) sulphate hydrate	Standard method, practical method	Grades and exams
January 2	3	Presentation method Discussion method	Complex preparation Pentathioureadicupper (I) nitrate	Standard method, practical method	Grades and exams

January 3	**3**	**Presentation method Discussion method**	**Complex preparation Potassium trioxalatoferrale(III) Hydrate**	**Standard method, practical method**	**Grades and exams**
January 4	**3**		**Complex preparation Hexaamminecobalt (III) chloride**		
February 1	**3**	**Presentation method Discussion method**	**Complex preparation Pentaamminechloridocobalt(III) chloride**	**Standard method, practical method**	**Grades and exams**
February 2	**3**	**Presentation method Discussion method**	**Complex preparation nitrito ammine Penta cobalt(III) chloride**	**Standard method, practical method**	**Grades and exams**
March 1	**3**	**Presentation method Discussion method**	**Second semester exam**	**Standard method, practical method**	**Grades and exams**
March 2	**3**	**Presentation method Discussion method**	**Complex preparation Pentaamminenitro cobalt(III) chloride**	**Standard method, practical method**	**Grades and exams**
March 3	**3**	**Presentation method Discussion method**	**Pentaamminenitratocobalt(III) nitrate**	**Standard method, practical method**	**Grades and exams**
March 4	**3**	**Presentation method Discussion method**	**Complex preparation Potassium hexaisothiocyanatochromate(III) hydrate**	**Standard method, practical method**	**Grades and exams**
April 1	**3**	**Presentation method Discussion method**	**Complex preparation Trithioureacupper(I) chloride**	**Standard method, practical method**	**Grades and exams**
April 2	**3**	**Presentation method Discussion method**	**Cupper Complex trans–potassium dioxalatocupper(II) hydrate**	**Standard method, practical method**	**Grades and exams**
April 3	**3**	**Presentation method Discussion method**	**Complex preparation Bis-glycinatocupper(II) hydrate**	**Standard method, practical method**	**Grades and exams Grades and exams**
April 4	**3**	**Presentation method Discussion method**	**Complex preparation Bis-ethylenediaminecupper(II) nitrate**	**Standard method, practical method**	**Grades and exams**
May 1	**3**	**Presentation method Discussion method**	**Complex preparation Bis – acetylacetonatodiaqua cobalt(II)**	**Standard method, practical method**	**Grades and exams**
May 2	**3**	**Presentation method Discussion method**	**Complex preparation Pentaamminethiosulphatocobalt(III) chloride**	**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:	
Physical Chemistry Laboratory / Third Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
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	Study of the Kinetics of Hydrogen Peroxide Decomposition Using a Catalyst (Analytical Method)	Standard method, practical method	Grades and exams
October 2	3	Presentation method Discussion method	Study of the Kinetics of Hydrogen Peroxide Decomposition Using a Catalyst (Analytical Method)	Standard method, practical method	Grades and exams
October 3	3	Presentation method Discussion method	Study of the Kinetics of Hydrogen Peroxide Decomposition Using a Catalyst (Volumetric Method)	Standard method, practical method	Grades and exams
October 4	3	Presentation method Discussion method	Study of the Kinetics of Hydrogen Peroxide Decomposition Using a Catalyst (Volumetric Method)	Standard method, practical method	Grades and exams
November1	3	Presentation method Discussion method	Determination of the Order and Rate Constant of Ester Hydrolysis	Standard method, practical method	Grades and exams
November2	3	Presentation method Discussion method	Determination of the Order and Rate Constant of Ester Hydrolysis	Standard method, practical method	Grades and exams
November3	3	Presentation method Discussion method	Determination of the Rate Constant of Ethyl Acetate Saponification (Conductometric Method)	Standard method, practical method	Grades and exams
November4	3	Presentation method Discussion method	Determination of the Rate Constant of Ethyl Acetate Saponification (Conductometric Method)	Standard method, practical method	Grades and exams
December1	3	Presentation method Discussion method	Kinetics of Ethyl Acetate Saponification	Standard method, practical method	Grades and exams

December 2	**3**	**Presentation method Discussion method**	**Kinetics of Ethyl Acetate Saponification**	**Standard method, practical method**	**Grades and exams**
December 3	**3**	**Presentation method Discussion method**	**Determination of the Reaction Order of Bromide and Bromate Ions in an Alkaline Medium and the Half-Life Calculation**	**Standard method, practical method**	**Grades and exams**
December 4	**3**	**Presentation method Discussion method**	**Determination of the Reaction Order of Bromide and Bromate Ions in an Alkaline Medium and the Half-Life Calculation**	**Standard method, practical method**	**Grades and exams**
January 1	**3**	**Presentation method Discussion method**	**The Effect of Temperature on the Reaction Rate (Arrhenius (Equation**	**Standard method, practical method Standard method, practical method**	**Grades and exams**
January 2	**3**	**Presentation method Discussion method**	**The Effect of Temperature on the Reaction Rate (Arrhenius (Equation**	**Standard method, practical method**	**Grades and exams**
January 3	**3**	**Presentation method Discussion method**	**The Effect of Salt on the Chemical Reaction Rate**	**Standard method, practical method**	**Grades and exams**
January 4	**3**		**First Semester Exams**		
February 1	**3**	**Presentation method Discussion method**	**The Effect of Salt on the Chemical Reaction Rate**	**Standard method, practical method**	**Grades and exams**
February 2	**3**	**Presentation method Discussion method**	**Determination of the Order, Rate Constant, and Activation Energy for the Formation of a Colored Complex**	**Standard method, practical method**	**Grades and exams**
March 1	**3**	**Presentation method Discussion method**	**Determination of the Order, Rate Constant, and Activation Energy for the Formation of a Colored Complex**	**Standard method, practical method**	**Grades and exams**

March 2	**3**	**Presentation method Discussion method**	**Equivalent Conductivity of a Strong Electrolyte**	**Standard method, practical method**	**Grades and exams**
March 3	**3**	**Presentation method Discussion method**	**Equivalent Conductivity of a Strong Electrolyte**	**Standard method, practical method**	**Grades and exams**
March 4	**3**	**Presentation method Discussion method**	**Determination of the Rate Constant for the Decomposition of Weak Electrolytes from Measuring Their Equivalent Conductivity**	**Standard method, practical method**	**Grades and exams**
April 1	**3**	**Presentation method Discussion method**	**Determination of the Rate Constant for the Decomposition of Weak Electrolytes from Measuring Their Equivalent Conductivity**	**Standard method, practical method**	**Grades and exams**
April 2	**3**	**Presentation method Discussion method**	**Titration Using Electrical Conductivity Between:** **1.Strong Acid and Strong Base** **2 .Weak Acid and Weak Base**	**Standard method, practical method**	**Grades and exams**
April 3	**3**	**Presentation method Discussion method**	**Titration Using Electrical Conductivity Between:** **.1 Strong Acid and Strong Base** **2. Weak Acid and Weak Base**	**Standard method, practical method**	**Grades and exams** **Grades and exams**
April 4	**3**	**Presentation method Discussion method**	**Titration Using Electrical Conductivity Between a Mixture of Strong Acid and Weak Acid with a Strong Base**	**Standard method, practical method**	**Grades and exams**
May 1	**3**	**Presentation method**	**Titration Using Electrical**	**Standard method, practical method**	**Grades and exams**

		Discussion method	**Conductivity Between a Mixture of Strong Acid and Weak Acid with a Strong Base**		
May 2	**3**	**Presentation method Discussion method**	**Decomposition Voltage**	**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)	Physical Chemistry Laboratory / Department of Chemistry
Main references (sources)	Fundamentals of Physical Chemistry by Omar Bin Abdullah Al-Hazzazi
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	

Course Description Form

1. Course Name:	
Quantum and Spectra/ 4th year	
2. Course Code:	
3. Semester / Year:	
Annual / 2024-2025	
4. Description Preparation Date:	
18/9/2024	
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)	
60 hours per year / 2 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 quantum science 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. Solving problems method. 4. Brainstorming method.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
Sep. 2	2		**The quantum mechanic**	Standard and discussion method	Class performance and exams
Sep. 3	2		**The origins of quantum mechanic**	Standard and discussion method	Class performance and exams
Sep. 4	2		**Failures in classical physics**	Standard and discussion method	Class performance and exams
Oct. 1	2		**Black body radiation**	Standard and discussion method	Class performance and exams
Oct. 2	2		**The heat capacities**	Standard and discussion method	Class performance and exams
Oct. 3	2		**Photoelectric effect**	Standard and discussion method	Class performance and exams
Oct. 4	2		**Atomic and molecular spectrum**	Standard and discussion method	Class performance and exams
Nov. 1	2		**Evolution of the concept of the atom**	Standard and discussion method	Class performance and exams
Nov. 2	2		**Schrodinger equation**	Standard and discussion method	Class performance and exams
Nov. 3	2		**Born interpretation of the wave function**	Standard and discussion method	Class performance and exams
Nov. 4	2		**Principles of quantum mechanics**	Standard and discussion method	Class performance and exams
Des. 1	2		**The uncertainty Principle**	Standard and discussion method	Class performance and exams
Des. 2	2		**Applications of quantum mechanics**	Standard and discussion method	Class performance and exams
Des. 3	2		**Translational motion (particle in a box)**	Standard and discussion method	Class performance and exams
Des.4	2		**Rotational motion (particle on a ring)**	Standard and discussion method	Class performance and exams
Jan. 1	2		**Vibrational motion (harmonic oscillator)**	Standard and discussion method	Class performance and exams
Jan. 2	**Spring holiday**				
Jan. 3					

Jan. 4	2		**Introduction to Spectrum**	Standard and discussion method	Class performance and exams
Feb. 1	2		**Electromagnetic spectrum**	Standard and discussion method	Class performance and exams
Feb. 2	2		**Microwave Spectroscopy**	Standard and discussion method	Class performance and exams
Feb. 3	**Student application in schools**				
Feb. 4					
Mar. 1					
Mar. 2					
Mar.3					
Mar. 4					
Apr. 1	2		**Infrared spectroscopy**	Standard and discussion method	Class performance and exams
Apr. 2	2		**Electronic Spectra**	Standard and discussion method	Class performance and exams
Apr. 3	2		**Nuclear magnetic resonance**	Standard and discussion method	Class performance and exams
Apr. 4	2		**General Review**	Standard and discussion method	Class performance and exams

11. Course Evaluation	
11- 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. 12- 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)	Muthanna Abdul Jabbar Shanshal**, Introduction to Quantum Mechanics.** Laila Mohammed 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 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	
Optional /Heterogeneous Loops / Fourth Stage	
2. Course Code	
3. Semester/Year	
annual	
4. Date of preparation of this description	
18/9/2024	
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 penta-heterocyclic compounds**	**Standard method**	**Classroom performance and exams**

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. Pyrazolenes (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:	
Nano chemistry / 4 stage	
2. Course Code:	
3. Semester / Year:	
Annual / 2024-2025	
4. Description Preparation Date:	
18/9/2024	
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)	
150 hours per year / 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: **Ass. Prof. Mohammed ghazee abed-alkareem** Email: mgchemo**@tu.edu.iq**	
8. Course objectives	
Course objectives	• Providing students with knowledge of the principles of nano field . • 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	2		Nano chemistry	Standard and practical method	Class performance and exams
Sep. 4	2		Nano materils	Standard and practical method	Class performance and exams
Oct. 1	2		Nano technology	Standard and practical method	Class performance and exams
Oct. 2	2		Traditional non-nanomaterials	Standard and practical method	Class performance and exams
Oct. 3	2		Advance nano materials	Standard and practical method	Class performance and exams
Oct. 4	2		Exam 1	Standard and practical method	Class performance and exams
Nov. 1	2		Classification of nano materials	Standard and practical method	Class performance and exams
Nov. 2	2		optical materials	Standard and practical method	Class performance and exams
Nov. 3	2		Catalyst nano materials	Standard and practical method	Class performance and exams
Nov. 4	2		Syntheses nano materials	Standard and practical method	Class performance and exams
Des. 1	2		Mixed method	Standard and practical method	Class performance and exams
Des. 2	2		Exam 2	Standard and practical method	Class performance and exams
Des. 3	2		Leser method	Standard and practical method	Class performance and exams
Des.4	2		lfloroene	Standard and practical method	Class performance and exams
Jan. 1	2		lnano practical	Standard and practical method	Class performance and exams
Jan. 2	2		Nano tube	Standard and practical method	Class performance and exams

Jan/ 3					
Jan. 4					
Feb. 1	2		application of nano chemistry	Standard and practical method	Class performance and exams
Feb. 2	2		Exam 3	Standard and practical method	Class performance and exams
Feb. 3	2		Nano of polymer	Standard and practical method	Class performance and exams
Feb. 4	2		Shape of nano compunds	Standard and practical method	Class performance and exams
Mar. 1	2		Mechanical properties	Standard and practical method	Class performance and exams
Mar. 2	2		application on future	Standard and practical method	Class performance and exams
Mar.3	2		Exam 4	Standard and practical method	Class performance and exams
Mar. 4	2		**Nano in medicine field**	Standard and practical method	Class performance and exams
Apr. 1	2		**Nano in physics field**	Standard and practical method	Class performance and exams
Apr. 2	2		**Optical properties**	Standard and practical method	Class performance and exams
Apr. 3	2		**Laser method**	Standard and practical method	Class performance and exams
Apr. 4	2		**X –ray in nano**	Standard and practical method	Class performance and exams
May 1	2		**General review**	Standard and practical method	Class performance and exams

11. Course Evaluation
13- 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. 14- 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)	Morrison and boyd
Main references (sources)	
Recommended books and references (scientific journals, reports …)	
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

1. **Course Name: Indesterial Chemistry - Fourth Stage**
2. **Course Code:**
3. **Semester / Year:** Course for the academic year 2024-2025
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 Ayoob Yass **Email:** emanaywb@tu.edu.iq
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		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	**2**		**Pesticides and fertilizers industry**	**----------**	----------
January4	**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 textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course description form

1. Course name
Measurement and evaluation for the fourth stage
2. Course code
3. Semester/year
Year 2024-2025
4. The date this description was prepared
18/9/2024
5. Available forms of attendance
Attend my class + electronic class onGoogle 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)
2 hours per week = 60 hours / units 2 units
7. Name of the course administrator (if more
Name: M. Intisar Modheher Khairo Email:intisar.modheher@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 the relationship between them**		**2**	**September 4**
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**
					The application period is (45)

					days from 3/1/2024 until 4/15/2024.
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:
Biochemistry
2. Course Code : KH
3. Semester / Year:
(Fourth) 2024-2025
4. Date this description was prepared
18/9/2024
5. forms of attendance available
In – person class in addition to the class for support class by used googleclass room / code: 72cnbqd
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

10. Course structure: the study starts on 12/9/2023 and ends on 9/5/2024

week	W watch es	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:	
18/9/2024	
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	Unsaturated Systems	Standard method, practical method	Grades and exams

		Discussion method		Standard method, practical method	
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 metho	Separation or Sorting Unit Ions	Standard method, practical method	Grades and exams 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 , 7th (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 , 7th (2005).

Course Description Form

1. Course Name:	
Coordination Chemistry / Stage Four	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
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: 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
November1	2	Presentation method Discussion method	Aldehydes and ketones detection and differentiation	Standard method, practical method	Grades and exams
November2	2	Presentation method Discussion method	Monthly exam with submission of first report	Standard method, practical method	Grades and exams
November3	2	Presentation method Discussion method	Detection of esters, anhydrides and tannins	Standard method, practical method	Grades and exams
November4	2	Presentation method Discussion method	Detection of carboxylic acids, amines and phenols	Standard method, practical method	Grades and exams
December1	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 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**	**Unknown diagnosis No. 2**	**Standard method, practical method**	**Grades and exams**

		Discussion metho			**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 , 7th (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 , 7th (2005).

Course Description Form

1. Course Name:	
OPTIONAL / first Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
5. Available Attendance Forms:	
Face-to-face lectures and online classes (Classroom)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 4 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**	Nano chemistry	**Standard method, practical method**	**Grades and exams**
October 2	**2**	**Presentation method Discussion method**	Nano materils	**Standard method, practical method**	**Grades and exams**
October 3	**2**	**Presentation method Discussion method**	Nano technology	**Standard method, practical method**	**Grades and exams**
October 4	**2**	**Presentation method Discussion method**	Traditional non-nanomaterials	**Standard method, practical method**	**Grades and exams**
November1	**2**	**Presentation method Discussion method**	Advance nano materials	**Standard method, practical method**	**Grades and exams**
November2	**2**	**Presentation method Discussion method**	Exam 1	**Standard method, practical method**	**Grades and exams**
November3	**2**	**Presentation method Discussion method**	Classification of nano materials	**Standard method, practical method**	**Grades and exams**
November4	**2**	**Presentation method Discussion method**	optical materials	**Standard method, practical method**	**Grades and exams**
December1	**2**	**Presentation method Discussion method**	Catalyst nano materials	**Standard method, practical method**	**Grades and exams**
December 2	**2**	**Presentation method Discussion method**	Syntheses nano materials	**Standard method, practical method**	**Grades and exams**
December 3	**2**	**Presentation method Discussion method**	Mixed method	**Standard method, practical method**	**Grades and exams**
December 4	**2**	**Presentation method Discussion method**	Exam 2	**Standard method, practical method**	**Grades and exams**

January 1	**2**	**Presentation method Discussion method**	Leser method	**Standard method, practical method Standard method, practical method**	**Grades and exams**
January 2	**2**	**Presentation method Discussion method**	floroene\	**Standard method, practical method**	**Grades and exams**
January 3	**2**	**Presentation method Discussion method**	nano practical\	**Standard method, practical method**	**Grades and exams**
January 4		**Presentation method Discussion method**	**Nano tube**		
February 1	**2**	**Presentation method Discussion method**	application of nano chemistry	**Standard method, practical method**	**Grades and exams**
February 2	**2**	**Presentation method Discussion method**	Exam 3	**Standard method, practical method**	**Grades and exams**
March 1	**2**	**Presentation method Discussion method**	Nano of polymer	**Standard method, practical method**	**Grades and exams**
March 2	**2**	**Presentation method Discussion method**	Shape of nano compunds	**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**	**Mechanical properties**	**Standard method, practical method**	**Grades and exams**
April 1	**2**	**Presentation method Discussion method**	application on future	**Standard method, practical method**	**Grades and exams**
April 2	**2**	**Presentation method Discussion method**	Exam 4	**Standard method, practical method**	**Grades and exams**

April 3	**2**	**Presentation method Discussion method**	**Nano in medicine field**	**Standard method, practical method**	**Grades and exams Grades and exams**
April 4	**2**	**Presentation method Discussion method**	**Nano in physics field**	**Standard method, practical method**	**Grades and exams**
May 1	**2**	**Presentation method Discussion method**	**Optical properties**	**Standard method, practical method**	**Grades and exams**
May 2	**2**	**Presentation method Discussion method**	**Laser method**	**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:	
Organic Chemistry / first Stage	
2. Course Code	
3. Semester / Year	
Annual	
4. Description Preparation Date:	
18/9/2024	
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 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 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	