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: Master's degree in Chemistry

Final Certificate Name: Master's degree in Chemistry

Academic System: Annual/Courses

Description Preparation Date: 18/9/2025

Signature:

Department Head's Name:
Dr. Ban Dawood Saleh
Date: 7/10/2025

جامعة تكريت
شعبة ضمان الجودة والاداء الجامعي
كلية التربية للبنات

Signature:

Scientific Assistant's Name:
Dr. Ashraf Gamal Mahmoud
Date: 7/10/2025

Review the file by: م.شهد خالد حميد
Quality Assurance and University Performance Department
Name of the Director of the Quality Assurance and University Performance:
Department:
Date: 7/10/2025
Signature:

Approval of the Dean
7/10/2025
الأستاذ الدكتورة
نجلاء عبد الحسين عليوي
عميد كلية التربية للبنات

1. Program Vision

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

2. Program Mission

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

3. Program Objectives

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

4. Program Accreditation

Is the program accredited? From which authority? No.

5. Other external influences

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

6.Program Structure

Program Structure	Number of Courses	A study unit	Percentage	Notes
Enterprise Requirements				
College Requirements				
Department Requirements				
Summer Training				
Others				

* 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	
2026-2025 M.Sc. / First Semester		Advanced Organic Chemistry	**2**	
		Advanced Analytical Chemistry	**2**	
		Advanced Biochemistry	**2**	
		Advanced Inorganic Chemistry	**2**	
		Advanced Physical Chemistry	**2**	
		English Language	**1**	
		Research Methodology	**1**	

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
Professor	Organic Chemistry	Organic Chemistry	.	1	
Professor	Analytical Chemistry	Analytical Chemistry		1	
Professor	Biochemistry	Biochemistry		1	
Professor	English Language	English Language		1	
Assistant Professor	Physical Chemistry	Physical Chemistry		2	
Assistant Lecturer	Inorganic Chemistry	Inorganic Chemistry		1	
Assistant Lecturer	Analytical Chemistry	Analytical Chemistry		1	

12.Acceptance Criterion

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

13. The most important sources of information about the program

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

Program Skills Outline

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

14. Program Development Plan

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

Program Skills Outline

Required program Learning outcomes

Year/ Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
2025 2026/			Mandatory	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
		Advanced Organic Chemistry	Basic												
		Advanced Analytical Chemistry	Basic												
		Advanced Biochemistry	Basic												
		Advanced Inorganic Chemistry	Basic												
		Advanced Physical Chemistry	Basic												
		English Language	Basic												
		Research Methodology	Basic												

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

Course Description Form

1. Course Name:	
Advanced Physical Chemistry / Master's level	
2. Course Code:	
3. Semester / Year:	
Semester / 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours per Semester / 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 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- Problem solving method. 4- Brainstorming method.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
Sep. 1	2		**General properties of gases**	Standard and practical method	Class performance and exams
Sep. 2	2		**Ideal gas laws**	Standard and practical method	Class performance and exams
Sep. 3	2		**Kinetic theory of ideal gases**	Standard and practical method	Class performance and exams
Sep. 4	2		**The First law of thermodynamics**	Standard and practical method	Class performance and exams
Oct. 1	2		**Energy and enthalpy**	Standard and practical method	Class performance and exams
Oct. 2	2		**Thermochemistry**	Standard and practical method	Class performance and exams
Oct. 3	2		**The Second law of thermodynamics**	Standard and practical method	Class performance and exams
Oct. 4	2		**The Third law of thermodynamics**	Standard and practical method	Class performance and exams
Nov. 1	2		**The Free energy**	Standard and practical method	Class performance and exams
Nov. 2	2		**Chemical equilibrium**	Standard and practical method	Class performance and exams
Nov. 3	2		**kinetics of chemical reactions**	Standard and practical method	Class performance and exams
Nov. 4	2		**The rate of the reaction**	Standard and practical method	Class performance and exams
Des. 1	2		**Reaction order**	Standard and practical method	Class performance and exams
Des. 2	2		**Methods used to find the reaction rate constant**	Standard and practical method	Class performance and exams
Des. 3	2		**The relationship between the rate of reaction and temperature**	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 (2) exams during the semester, to extract the 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:
Hormone / Master
2. Course Code:
3. Semester / Year:
Semester
4. Description Preparation Date:
18/9/2025
5. Available Attendance Forms:
Lectures in person presence with electronic classes (Classroom)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 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**
February 1	2	Method of presentation and method of discussion	Hormones	The standard method, the practical method	Class performance and exams
February 2	2	Method of presentation and method of discussion	Mechanisms of Hormone Action	The standard method, the practical method	Class performance and exams
March 1	2	Method of presentation and method of discussion	Pituitary Gland	The standard method, the practical method	Class performance and exams
March 2	2	Method of presentation and method of discussion	Pituitary Hormones	The standard method, the practical method	Class performance and exams
March 3	2	Method of presentation and method of discussion	Hypothalamus	The standard method, the practical method	Class performance and exams
March 4	2	Method of presentation and method of discussion	Hypothalamic Hormones	The standard way, the practical way	Class performance and exams
April 1	2	Method of presentation and method of discussion	Adrenal Gland	The standard method , the practical method	Class performance and exams
April 2	2	Method of presentation and method of discussion	Thyroid Gland	The standard method , the practical method	Class performance and exams
April 3	2	Method of presentation and method of discussion	Parathyroid Gland	The standard method, the practical method	Class performance and exams
April 4	2	Method of presentation and method of discussion	Sex Hormones	Standard method	Class performance and exams
May 1	2	Method of presentation and method of discussion	Exam	Standard method	Class performance and exams

May 2	2	Method of presentation and method of discussion	Bone-Controlling Hormones	Standard method	Class performance and exams
May 3	2	Method of presentation and method of discussion	Diseases Related to Hormone Deficiency	Standard method	Class performance and exams
May 5	2	Method of presentation and method of discussion	Final Exams	Standard method	Class performance and exams
May 15	2	Method of presentation and method of discussion	Final Exams	Standard method	Class performance and exams
			final		

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

1. Course Name:
Biotechnology / Master
2. Course Code:
3. Semester / Year:
Semester
4. Description Preparation Date:
18/9/2025
5. Available Attendance Forms:
Lectures in person presence with electronic classes (Classroom)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 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**
February 1	2	Method of presentation and method of discussion	What are separation methods?	The standard method, the practical method	Class performance and exams
February 2	2	Method of presentation and method of discussion	Types of separation	The standard method, the practical method	Class performance and exams
March 1	2	Method of presentation and method of discussion	Extraction and its types	The standard method, the practical method	Class performance and exams
March 2	2	Method of presentation and method of discussion	Extraction and its types	The standard method, the practical method	Class performance and exams
March 3	2	Method of presentation and method of discussion	Mathematical problems for extraction	The standard method, the practical method	Class performance and exams
March 4	2	Method of presentation and method of discussion	Separation chromatography	The standard way, the practical way	Class performance and exams
April 1	2	Method of presentation and method of discussion	TLC	The standard method , the practical method	Class performance and exams
April 2	2	Method of presentation and method of discussion	Gel filtration separation	The standard method , the practical method	Class performance and exams
April 3	2	Method of presentation and method of discussion	Ion exchange separation	The standard method, the practical method	Class performance and exams
April 4	2	Method of presentation and method of discussion	Electrophoresis	Standard method	Class performance and exams
May 1	2	Method of presentation and method of discussion	Exam	Standard method	Class performance and exams

May 2	2	Method of presentation and method of discussion	ELISA separation	Standard method	Class performance and exams
May 3	2	Method of presentation and method of discussion	HPLC	Standard method	Class performance and exams
May 5	2	Method of presentation and method of discussion	Final exams	Standard method	Class performance and exams
May 15	2	Method of presentation and method of discussion	Final exams	Standard method	Class performance and exams
			final		

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

1. **Course Name: natural product - master**
2. **Course Code:**
3. **Semester / Year:2ed** Course for the academic year 2025-2026
4. **Description Preparation Date: 18/9/2025**
5. **Available Attendance Forms:**
Class attendance + electronic classes on the Google Classroom platform will be a supporting class for the in-person class and according to the controls and instructions of the Ministry of Higher Education and Scientific Research.
6. **Number of Credit Hours (Total) / Number of Units (Total)**
30 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 Outco	Unit or subject name	Learning method	Evaluation method
February 1	2		General introduction	Standard method And discussion	Class performance and exams
February 1	2		Chemistry of natural products	Standard method And discussion	Class performance and exams
February 1	2		Chemistry of natural products	Standard method And discussion	Class performance and exams
February 1	2		Biosynthesis	Standard method And discussion	Class performance and exams
March 1	2		Monthly exam	Standard method And discussion	Class performance and exams
March 2	2		Structural structure, building units, and naming:	Standard method And discussion	Class performance and exams
March 3	2		Poly terpenes	Standard method And discussion	Class performance and exams
March 4	2		Steroids	Standard method And discussion	Class performance and exams
April 1	2		Classification of the steroid family and nomenclature	Standard method And discussion	Class performance and exams
April 2	2		Monthiy exam	Standard method And discussion	Class performance and exams
April 3	2		Biosynthesis of steroids	Standard method And discussion	Class performance and exams
April 4	2		Alkaloids The structural structure and building units, to name: ♣ Methods of extraction, separation and purification	Standard method And discussion	Class performance and exams
Mays1	2		Chemical synthesis for	Standard method And discussion	Class performance

					and exams
Mays 2	**2**		**selected examples**	**Standard method And discussion**	**Class performance and exams**
Mays 3	**2**		**Monthly 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	

1. S.V. Berlin, Springer, ISBN: 3-540-40669-7. Meenakshi Jointly published with Narosa Publishing House 2013, XXXI, 840 p., Hardcover ISBN: 978-3-540-40669-3.

2. A. M. Dawidar, M. Abdel-Mogib, M. A. Metwally, S. N. Ayyad, (1998). *Chemistry of Natural products.* 1st. ed. (ISBN. 977-19-5462-8), Mans. University Press, Mansoura Egypt

1. Satyajit D. Sarker; Lutfun Nahar, (2007), *Chemistry for Pharmacy Students* (*General, Organic and Natural Product Chemistry*). John Wiley & Sons Ltd,.
2. D. S. Satyajit, L. Zahid, I. G. Alexander, (2006). Natural Products Isolation, 2nd. Ed., Humana Press Inc., Totowa, New Jersey 07512, ISBN:1-59259-955-9.
3. L. G. Wade, (2010), *Organic Chemistry*, 7th edn, New Jersey, Pearson Education Inc., ISBN: 0-321-61006-7.

K. Robards, P. R. Haddad & P. E. Jackson, (2004), Principles and Practice of Modern Chromatographic *Methods*, Amsterdam, Elsevier, ISBN: 0-12-589570-4.

http://www.springer.com/natural productsl+chemistry/journal/
http://www.journals.elsevier.com/journal-of-natural products-chemistry/
http://www.sciencedirect.com/science/chemistry/natural products chemistry.
http://www.chemweb.com. & http://www.chemistry.com.
http://www.chm.bris.ac.uk/webprojects2002/pdavies/ & http://www.ebooks.com.

Journal of natural products records. Journal of natural products research.

Course Description Form

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

10. Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
October 1	2	Diction method Discussion method	Stereo Chemistry	Standard method, practical method	Classroom performance and exams
October 2	2	Diction method Discussion method	Fundemanttales of Stereo Chemistry	Standard method, practical method	Classroom performance and exams
October 3	2	Diction method Discussion method	Isomers classification	Standard method, practical method	Classroom performance and exams
October 4	2	Diction method Discussion method	Fischer Projection	Standard method, practical method	Classroom performance and exams
November 1	2	Diction method Discussion method	Chiral Center Formation	Standard method, practical method	Classroom performance and exams
November 2	2	Diction method Discussion method	Diastereoimers separation	Standard method, practical method	Classroom performance and exams
November 3	2	Diction method Discussion method	Conformation isomers of Alkanes	Standard method -Practical method	Classroom performance and exams
November 4	2	Diction method Discussion method	Conformation isomers of cycloalkanes	Standard method -Practical method	Classroom performance and exams
December 1	2	Diction method Discussion method	Conformation isomers of cyclohexane	Standard method, practical method	Classroom performance and exams
December 2	2	Diction method Discussion method	Morphological analysis of cyclohexane	Standard method	Classroom performance and exams
December3	2	Diction method Discussion method	Molecular addition	Standard method	Classroom performance and exams

December 4	**2**	**Diction method Discussion method**	**Stereoisomers Reaction**	**Standard method**	**Classroom performance and exams**
January 1	**2**	**Diction method Discussion method**	**Reaction of chiral molecules**	**Standard method**	**Classroom performance and exams**
January 2	**2**	**Diction method Discussion method**	**Reaction that involve racemization**	**Standard method**	**Classroom performance and exams**
January 3	**2**	**Diction method Discussion method**	**Functional isomerism**	**Standard method**	**Classroom performance and exams**
January 4	**2**	**/**	**First Semester Exam**		
February 1	**2**	**Diction method Discussion method**	**Conformation isomers**	**Standard method**	**Classroom performance and exams**
February 2	**2**	**Diction method Discussion method**	**Molecular addition**	**Standard method**	**Classroom performance and exams**
March 1	**2**	**Diction method Discussion method**	**Anti-addition reaction**	**Standard method**	**Classroom performance and exams**
March 2	**2**	**Diction method Discussion method**	**Electrophilic addition**	**Standard method**	**Classroom performance and exams**
March 3	**2**	**Diction method Discussion method**	**Free- radical addition**	**Standard method**	**Classroom performance and exams**

March 4	**2**	**Diction method Discussion method**	**Stereoisomers**	**Standard method**	**Classroom performance and exams**
April 1	**2**	**Diction method Discussion method**	**Structural isomerism**	**Standard method**	**Classroom performance and exams**

April 2	**2**	**Diction method Discussion method**	**Conformation isomers**	**Standard method**	**Classroom performance and exams**
April 3	**2**	**Diction method Discussion method**	**Anomeric effect**	**Standard method**	**Classroom performance and exams**
April 4	**2**	**Diction method Discussion method**	**Mechanism of anomerization**	**Standard method**	**Classroom performance and exams**
May 1	**2**	**Diction method Discussion method**	**Origin of the Anomeric effect**	**Standard method**	**Classroom performance and exams**
May 2	**2**	**Diction method Discussion method**	**Altonas interpretation**	**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:	
Heterocyclic Chemistry M.Sc.	
2. Course Code:	
3. Semester / Year:	
Annual / 2025-2026	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Class attendance + electronic classes (Google Classroom), which will be a supporting class for the in-person class, and according to the conditions and instructions of the Ministry of Higher Education and Scientific Research.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours per year / 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: **Prof. Dr. Fawzi Hameed Jumaaa** Email: **fawzi.99883@tu.edu.iq**	
8. Course objectives	
Course objectives	• Providing students with knowledge of the principles of organic chemistry as one of the basic branches of heterocyclic 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**
Jan. 3	**6**		**Pyridine - its preparation - electrophilic compensation reactions**	**Standard and practical method**	**Class performance and exams**
Jan. 4	**6**		**Pyridine - its preparation - nucleophilic substitution reactions**	**Standard and practical method**	**Class performance and exams**
Feb. 1	**6**		**Quinoline and isoquinoline – their preparation and interactions**	**Standard and practical method**	**Class performance and exams**
Feb. 2	**6**		**Furan, pyrrole and thiaophene - preparation and interactions**	**Standard and practical method**	**Class performance and exams**
Feb. 3	**6**		**Indole – preparation and reactions**	**Standard and practical method**	**Class performance and exams**
Feb. 4	**6**		**Naming heterocyclic compounds**	**Standard and practical method**	**Class performance and exams**
Mar. 1	**6**		**Compounds 1,3-Azoles - their preparation and reactions**	**Standard and practical method**	**Class performance and exams**
Mar. 2	**6**		**Compounds 1,2-Azoles - their preparation and reactions**	**Standard and practical method**	**Class performance and exams**
Mar. 3	**6**		**Diazine compounds - their preparation and reactions**	**Standard and practical method**	**Class performance and exams**
Mar. 4	**6**		**Oxazine and thiazine - their preparation and interactions**	**Standard and practical method**	**Class performance and exams**

Apr. 1	**6**		**Benzooxazole and benzothiazole – their preparation and interactions**	**Standard and practical method**	**Class performance and exams**
Apr. 2	**6**		**Reactions according to their discoverers**	**Standard and practical method**	**Class performance and exams**
Apr. 3	**6**		**Hexacyclic compounds - benzooxazine-one**	**Standard and practical method**	**Class performance and exams**
Apr.4	**6**		**Heptacyclic compounds diazepine, dioxpine, and diathapine**	**Standard and practical method**	**Class performance and exams**
May. 1	**6**		**Semester exam**	**Standard and practical method**	**Class performance and exams**

11. Course Evaluation

3- Formative evaluation through daily exams, observing the student's performance in class discussions and homework assignments, and classroom evaluation. This grade does not exceed 30% of the total.
4- Diagnostic evaluation by semester and final exams to issue judgments of success and failure.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Augustin, R.M., translated by Al-Nima, Hikmat Hussein and Abdul Malik, Rasmi Tawfiq and Yassin, Ahmed Abdul Aziz, "Introduction to Heterocyclic Compounds," Mosul University Press (1983).
Main references (sources)	1-Gupta R.R.,Kumar M. and Gupta V. "Heterocyclic Chemistry II ,Five - Membered Heterocycles", Springer,(1999). 2-Louis D.Q. and John A.T., "Fundamentals of Heterocyclic Chemistry, Importance in Natural and in the Synthesis of Pharmaceuticals, 10thEdition, John Wiley& Sons. Inc., (2010).
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:
Advanced Biochemistry
2. Course Code :
3. Semester / year
First semester / 2025-2026
4. Date this description was prepared
18/9/2025
5. forms of attendance available
In – person class in addition to the class for support class by used googleclass room /
6. Number of study hours (total) / Number of units (total)
2 hours per week = 30 hours / 2 unite
7.Name the course administrator, if more than one name
Asra'a Ismail Yaseen Altaii Email: altaiiasr@tu.edu.iq

Subject Objectives	• Enabling students to identify biochemistry components and their reaction mechanisms • Introduction students to the most important metabolic reactions • Developing thinking and analysis skills, link metabolic reaction and calculate the released energy • Developing skills thatb enable students to extract and purify enzymes.
9. 9. Teaching and Learning Strategies	
Strategy	• **Applying various teaching methods, including** • **Standard method (lecturing) :** • **Text method** • **Problem solving method**

10. Course structure: the study starts on 10/9/2024 and ends on 23/12/2024					
week	W watches	Learning outcomes required	Unit name or the topic	Method learning	Road evaluation
September 2	2	Skills and knowledge and cognitive	Proteins, their composition	The lecture	Classroom performance and test
September 3	2	Value Skills . the student learns from during it on the structures protein strucure	The lecture	The lecture	Classroom performance and test
September 4	2		The lecture	The lecture	Classroom performance and test
October 1	2		The lecture	The lecture	Classroom performance and test
October 2	2		Enzyme composition	The lecture	Classroom performance and test
October 3	2		How do enzymes work	The lecture	Classroom performance and test
October 3	2		Kinetics of the primates	The lecture	Classroom performance and test
October 4	2		metabolism	The lecture	Classroom performance and test
November 1	2		ETC	The lecture	Classroom performance and test
November 2	2		metabolism of CHO	The lecture	Classroom performance and test
November 3	2		Regulation of blood glucose	The lecture	Classroom performance and test
November 4	2		Lipid metabolism	The lecture	Classroom performance and test
December 1	2		Biosynthesis of cholesterol	The lecture	Classroom performance and test
December 2	2		Protein metabolism	The lecture	Classroom performance and test

December 3	2		seminar		

11. course evaluation	
The grade is distributed out of 30% according to the tasks assigned to the student , such as daily preparation , daily exams , and oral exams….. etc End exam by 70% , final grade of 100%.....	
12. learning and teaching resources	
Required ks (methodology)	**Lehninger principles of Biochemistry / David L. Neslon**
Main references (sources)	**Biochemistry / stryer**
Scientific journals , reports…..	**Basics of Biochemistry**
Electronic References, Websites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/

Course Description Form

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

10- Course Structure

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

January 2	**2**	**Presentation method Discussion method**	**Band Splitting and Its Causes**	**Standard method, practical method**	**Grades and exams**
January 3	**2**	**Presentation method Discussion method**	**Monthly Exam**	**Standard method, practical method**	**Grades and exams**
January 4		**Presentation method Discussion method**	**Applications and Examples of NMR Spectroscopy**	**Standard method, practical method**	**Grades and exams**
February 1	**2**	**Presentation method Discussion method**	**Application Period**	**Standard method, practical method**	**Grades and exams**
February 2	**2**	**Presentation method Discussion method**	**Application Period**	**Standard method, practical method**	**Grades and exams**
March 1	**2**	**Presentation method Discussion method**	**Application Period**	**Standard method, practical method**	**Grades and exams**
March 2	**2**	**Presentation method Discussion method**	**Application Period**	**Standard method, practical method**	**Grades and exams**
March 3	**2**	**Presentation method Discussion method**	**Application Period**	**Standard method, practical method**	**Grades and exams**
March 4	**2**	**Presentation method Discussion method**	**Mass Spectroscopy, Ionization Process, Crushing Process, Components of Mass Spectrometer, Sample Placement Unit and Its Types**	**Standard method, practical method**	**Grades and exams**
April 1	**2**	**Presentation method Discussion method**	**Different Methods of Ionization Process, Crushing Mechanism of Positive Ions**	**Standard method, practical method**	**Grades and exams**
April 2	**2**	**Presentation method Discussion method**	**Chemical Ionization and Ionization by ,Electric Field Separation or Sorting Unit Ions**	**Standard method, practical method**	**Grades and exams**
April 3	**2**	**Presentation method Discussion 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:	
Advanced inorganic Chemistry / Masters	
2. Course Code	
3. Semester / Year	
First Couse (2025/ 2026)	
4. Description Preparation Date:	
18/9/2025	
5. Available Attendance Forms:	
Face-to-face lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
40 hours / 2 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
September	2	Presentation method Discussion method	Periodic table of elements and classification of elements	Standard method, practical method	Grades and exams
September	2	Presentation method Discussion method	Transitional elements	Standard method, practical method	Grades and exams
September	2	Presentation method Discussion method	Double electron pair	Standard method, practical method	Grades and exams
September	2	Presentation method Discussion method	Coordination numbers and their geometric shapes	Standard method, practical method	Grades and exams
September	2	Presentation method Discussion method	Effective atomic number rule (18 electrons)	Standard method, practical method	Grades and exams
September	2	Presentation method Discussion method	Theories explaining the nature of coordination bonds	Standard method, practical method	Grades and exams
October	2	Presentation method Discussion method	Valence Bond Theory (V.B.T)	Standard method, practical method	Grades and exams
October	2	Presentation method Discussion method	Crystal Field Theory (C.F.T)	Standard method, practical method	Grades and exams
October	2	Presentation method Discussion method	Splitting in octahedral complexes	Standard method, practical method	Grades and exams
October	2	Presentation method Discussion method	Splitting in tetrahedral complexes	Standard method, practical method	Grades and exams
November	2	Presentation method Discussion method	Jahn-Teller Distortions in Octahedral Complexes	Standard method, practical method	Grades and exams
November	2	Presentation method Discussion method	Molecular Orbital Theory (M.O.T)	Standard method, practical method	Grades and exams
November	2	Presentation method Discussion method	Molecular orbitals	Standard method, practical method	Grades and exams

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

10- Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation method
October 1	**2**	**Presentation method Discussion method**	The origin and development of science	**Standard method, practical method**	**Grades and exams**
October 2	**2**	**Presentation method Discussion method**	Aims of Science	**Standard method, practical method**	**Grades and exams**
October 3	**2**	**Presentation method Discussion method**	Scientific research	**Standard method, practical method**	**Grades and exams**
October 4	**2**	**Presentation method Discussion method**	Kinds of scientific research	**Standard method, practical method**	**Grades and exams**
November1	**2**	**Presentation method Discussion method**	Proplem	**Standard method, practical method**	**Grades and exams**
November2	**2**	**Presentation method Discussion method**	Detect of proplem	**Standard method, practical method**	**Grades and exams**
November3	**2**	**Presentation method Discussion method**	Preparing a research plan	**Standard method, practical method**	**Grades and exams**
November4	**2**	**Presentation method Discussion method**	Exam 1	**Standard method, practical method**	**Grades and exams**
December1	**2**	**Presentation method Discussion method**	Scientific research methods and tools	**Standard method, practical method**	**Grades and exams**
December 2	**2**	**Presentation method Discussion method**	Historical method, survey method	**Standard method, practical method**	**Grades and exams**
December 3	**2**	**Presentation method Discussion method**	Descriptive approach, statistical approach	**Standard method, practical method**	**Grades and exams**
December 4	**2**	**Presentation method Discussion method**	Main requirements for completing research	**Standard method, practical method**	**Grades and exams**

January 1	**2**	**Presentation method Discussion method**	Types of errors and their sources	**Standard method, practical method Standard method, practical method**	**Grades and exams**
January 2	**2**	**Presentation method Discussion method**	Personal exchange of information	**Standard method, practical method**	**Grades and exams**
January 3	**2**	**Presentation method Discussion method**	Exam 2	**Standard method, practical method**	**Grades and 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)	
Main references (sources)	
Recommended supplementary books and references (scientific journals, reports...)	
Electronic references, internet sites	https://scholar.google.com/ https://www.sciencedirect.com/ https://www.researchgate.net/