

Academic Program Description Form

University Name: Al-Nahrain University

Faculty/Institute: College of Pharmacy

Scientific Department: Pharmaceutical Chemistry

Academic or Professional Program Name: Pharmaceutical Chemistry

Final Certificate Name: Bachelor's Degree

Academic System: Semesters

Description Preparation Date: 23/03/2025

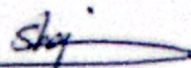
File Completion Date: 23/03/2025

Signature: 

Head of Department Name:

Prof. Dr. Mohammed Tassim Hamzah

Date: 23/3/2025

Signature: 

Scientific Associate Name:

Asst. Prof. Dr. Shaguna H. Hammed

Date: 24/3/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department: Dr. Noor Adil

Date: 23/3/2025

Signature: 



Approval of the Dean

Prof. Dr. Hyder B. Sa

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



Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

1. Program Vision

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

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

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

4. Program Accreditation

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

5. Other external influences

Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
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Institution Requirements	10	435		
College Requirements	10	435		
Department Requirements	10	435		
Summer Training	—	—		
Other	—	—		

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

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
1 st / 1 st semester	PHC113	Analytical Chemistry	3 hours	2 hours
1 st / 2 nd semester	PHC124	Organic Chemistry 1	3 hours	2 hours
2 nd /1 st semester	PHC211	Organic Chemistry 2	3 hours	2 hours
2 nd /2 nd semester	PHC221	Organic Chemistry 3	3 hours	2 hours
3 rd / 1 st semester	PHC311	Inorganic Pharmaceutical Chemistry	3 hours	2 hours
3 rd / 2 nd semester	PHC321	Pharmaceutical Organic Chemistry 1	3 hours	2 hours
4 th / 1 st semester	PHC412	Pharmaceutical Organic Chemistry 2	3 hours	2 hours
4 th / 2 nd semester	PHC422	Pharmaceutical Organic Chemistry 3	3 hours	2 hours
5 th / 1 st semester	PHC511	Pharmaceutical Organic Chemistry 4	2 hours	
5 th / 2 nd semester	PHC524	Advanced Pharmaceutical Analysis	3 hours	2 hours

8. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	1- Correct handling of chemicals and glassware 2- Operate scientific equipment in the correct and appropriate manner 3- Gaining experience in using different techniques for preparing medicines and chemicals
Skills	
Learning Outcomes 2	The skills goals special to the program 1 - Acquisition of the skill on how to identify and evaluate chemical compounds 2 - Acquisition of skill in the use of various methods of preparation and manufacture of chemical compounds 3- Acquiring the skill in writing scientific reports
Learning Outcomes 3	
Ethics	
Learning Outcomes 4	

9. Teaching and Learning Strategies
Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods
Implemented at all stages of the program in general.

11. Faculty			
Faculty Members			
Academic Rank	Specialization	Special Requirements/Skills (if applicable)	Number of the teaching staff

	General	Special			Staff	Lecturer
Professor	1				10	10
Assistant professor	1					
Teacher	3					
Assistant teacher	5					

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Syllabus development plan by adding or updating a Syllabus

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First year/ first semester	PHC113	Analytical chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC113	Practical Analytical chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
First year / second semester	PHC124	Organic chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC124	Practical Organic chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Second year/first semester	PHC211	Organic chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC211	Practical Organic chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√

Second year / second semester	PHC221	Organic chemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC221	Practical Organic chemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Third year/first semester	PHC311	Inorganic pharmaceutical chemistry	Basic	√	√	√	√	√	√	√	x	√	√	√	√
	PHC311	Practical Inorganic pharmaceutical chemistry													
Third year / second semester	PHC321	Organic pharmaceutical chemistry I	Basic	√	√	√	√	√	√	√	√	√	√	x	√
	PHC321	Practical Organic pharmaceutical chemistry I													

Forth year / first semester	PHC412	Organic pharmaceu tical chemistry II	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC412	Practical Organic pharmaceu tical chemistry II													
Forth year / second semester	PHC422	Organic pharmaceu tical chemistry III	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC422	Practical Organic pharmaceu tical chemistry III													

Fifth year / first semester	PHC511	Organic pharmaceutical chemistry IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PHC511	Practical Organic pharmaceutical chemistry IV													
Fifth year / second semester	PHC524	Advanced pharmaceutical Analysis	Basic	√	√	√	√	√	√	√	√	x	√	√	√
	PHC524	Practical Advanced pharmaceutical Analysis													

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

Course Description Form

1. Course Name:	
Analytical Chemistry	
2. Course Code: PHC113	
3. Semester / Year:	
First Stage/ 1st Semester/ 2024- 2025	
3. Description Preparation Date:	
2025	
4. Available Attendance Forms:	
Attendance	
5. Number of Credit Hours (Total) / Number of Units (Total)	
45 hours / 4credit	
6. Course administrator's name (mention all, if more than one name)	
Name: dr. mohammed jasim Email: dr.mohammed.jasim@nahrainuniv.edu.iq	
7. Course Objectives	
Course Objectives	1- Analytical Chemistry: Student Preparation 2- Providing support with information related to qualitative and quantitative chemical analyses 3- Studying the theories related to this.
8. Teaching and Learning Strategies	
Strategy	1- Theoretical Lectures 2- Practical Lab Skills 3- Whiteboard 4- Interactive Electronic Whiteboard

	5- Seminars (Questions and Discussion) 6- Homework
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9. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Review of elementary concepts important to analytical chemistry: Strong and weak electrolytes; important weight and concentration units.	Lectures	Oral and written exam
5-2	10		The evaluation of analytical data: Definition of terms, and An introduction to gravimetric analysis: Statistical analysis of data; rejection of data; precipitation methods; gravimetric factor.	Lectures	Oral and written exam
6	4		The scope of applications of gravimetric analysis: Inorganic precipitating agents; organic Precipitating agents.	Lectures	Oral and written exam
8-7	5		An introduction to volumetric methods of analysis: Volumetric calculations; acid-base equilibria and pH calculations.	Lectures	Oral and written exam
9	3		Buffer solutions: Theory of neutralization titrations of simple system.	Lectures	Oral and written exam

11-10	5		Theory of neutralization titrations of complex system; Precipitation titrations.	Lectures	Oral and written exam
12	4		Calculation of pH in complex system; Volumetric methods based on complex system.	Lectures	Oral and written exam
14-13	6		Equilibria in oxidation-reduction system; theory of oxidation- reduction titrations.	Lectures	Oral and written exam
15	4		Spectrophotometric analysis: An introduction to optical methods of analysis; Methods based on absorption of radiation.	Lectures	Oral and written exam

10. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Analytical Chemistry by Sto and West.
Main references (sources)	Fundamentals of Analytical Chemistry by Sto and West.
Recommended books and references (scientific journals, reports...)	Analytical Chemistry by Stook and West
Electronic References, Websites	

Course Description Form

1. Course Name:	
Practical Analytical Chemistry	
2. Course Code: PHC113	
First Stage	
3. Semester / Year	
2 nd Semester/ 2024- 2025	
4. Description Preparation Date:	
24/4/2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours / 1credit	
7. Course administrator's name (mention all, if more than one name)	
Name: assist. Lecture yasir Mohammed Email: yasir.kinaan@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	Preparing the students and supporting them with information related to qualitative and quantitative chemical analyses and studying the theories related that.
9. Teaching and Learning Strategies	
Strategy	1-Conducting scientific experiments 2-Acquiring skills in drug preparation 3-Building student confidence through presenting scientific research 4-Acquiring skills in drug identification and classification

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Laboratory safety rules	Demonstration of some laboratory equipment.	Practical	Lab-based quiz unknown
2	2	Glass ware laborat	Separation and identification of group 1 cations (individual test).	Practical	Lab-based quiz unknown
3	2	Prepare solutions from solids and liquids	Analysis of group 1 cataions mixture.	Practical	Lab-based quiz unknown
4	2	Titration principles	Preparation and standardization of an acid.	Practical	Lab-based quiz unknown
5	2	Titration of HCl w sodium Carbonate	Determination of the percentage of acetic acid.	Practical	Lab-based quiz unknown
6	2	Titration of HCl w NaOH	Analysis of sodium carbonate and sodium hydroxide mixture.	Practical	Lab-based quiz unknown
7	2	Titration of KMnO ₄ with oxalate acid	Determination of chloride by the Mohr method.	Practical	Lab-based quiz unknown
8	2	unknown sample determination	Determination of chloride by the Volhard method.	Practical	Lab-based quiz unknown
9	2	Titration of KMnO ₄ with ferrous sulfat	Preparation and standardization of 0.1N KMnO ₄ .	Practical	Lab-based quiz unknown
10	2	Determination of chloride by Mohr method unknown sample determination	Determination of ferrous form of iron in Mohr's salt.	Practical	Lab-based quiz unknown
11	2	Determination of water hardness	Determination of total hardness in tab water.	Practical	Lab-based quiz unknown
12	2	unknown sample determination	Gravimetric determination of Nickel.	Practical	Lab-based quiz unknown
11. Course Evaluation					
the score out of 20 is distributed according to the tasks assigned to the student, such as daily preparation, daily exams, oral and monthly exams, written tests, reports, etc					

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Analytical Chemistry Stook and West.
Main references (sources)	Fundamentals of Analytical Chemistry Stook and West.
Recommended books and references (scientific journals, reports...)	Analytical Chemistry by Stook and West
Electronic References, Websites	

Course Description Form

12. Course Name:	
Organic Chemistry I	
13. Course Code: PHC124	
14. Semester / Year:	
Second semester– first stage	
15. Description Preparation Date:	
2025	
16. Available Attendance Forms:	
Attendance	
17. Number of Credit Hours (Total) / Number of Units (Total)	
45 hr / 3 credit	
18. Course administrator's name (mention all, if more than one name)	
Name: dr. ahmad thamer +dr. ghassan qais Email: dr. ghassan.qais@nahrainuniv.edu.iq dr. ahamed.thamer@nahrainuniv.edu.iq	
19. Course Objectives	
Course Objectives	1-Understanding how to handle organic chemical compounds and their reactions 2-How to handle scientific instruments. 3-Learning through the use of various scientific techniques. 4-Knowing the methods used in the preparation of organic compounds.
20. Teaching and Learning Strategies	
Strategy	1- How to handle organic chemical compounds and their reactions. 2-How to handle scientific instruments. 3- Learning using various scientific techniques.

	4-Knowledge of methods used in the preparation of organic compounds.
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21. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		An introduction	Lectures	Oral and written ex
3-2	6		Alkanes and methane	Lectures	Oral and written ex
5-4	6		Alkenes 1 and 2	Lectures	Oral and written ex
7-6	6		Alkynes and Dienes	Lectures	Oral and written ex
9-8	6		Stereochemistry 1	Lectures	Oral and written ex
10-12	8		Alcohols and Ethers	Lectures	Oral and written ex
14-13	7		Benzene	Lectures	Oral and written ex
15	3		Cyclic alkenes	Lectures	Oral and written ex

22. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

23. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomson learning; CA,USA; 2010
Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomson learning; CA,USA; 2010
Recommended books and references (scientific journals, reports...)	Leroy G. Wade - Organic Chemistry-Pearson (2016)
Electronic References, Websites	

Course Description Form

1. Course Name:	
Practical Organic Chemistry I	
2. Course Code: PHC124	
3. Semester / Year:	
Second semester– first stage	
4. Description Preparation Date:	
2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hour / 1 credit	
7. Course administrator's name (mention all, if more than one name)	
Name: assist. Lecturer Yasir Mohammed Email: yasir. kinaan@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	1. Study of the classification, properties, preparation, and reactions of alkanes, alkenes, alkynes, alcohols, ethers, benzene, and the study of stereochemistry. 2. Understanding how to handle organic chemical compounds and their reactions. 3. How to handle scientific equipment. 4. Learning using various scientific techniques. 5. Knowledge of methods used in the preparation of organic compounds.

9. Teaching and Learning Strategies

Strategy	1-Conducting scientific experiments 2- Acquiring the skill of preparing medications 3- Building the student's confidence through presenting scientific research 4- Acquiring the skill of identifying and classifying medications
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4		Determination of melting point	Practical	Lab-based unknown quiz
3-4	4		Determination of boiling point	Practical	Lab-based unknown quiz
5-6	4		Solution and filtration	Practical	Lab-based unknown quiz
7-8	4		Re-crystallization	Practical	Lab-based unknown quiz
9-10	4		Extraction technique	Practical	Lab-based unknown quiz
11-12	4		Distillation technique	Practical	Lab-based unknown quiz
13-14	4		Sublimation technique	Practical	Lab-based unknown quiz
15	2		Elemental analysis	Practical	Lab-based

11. Course Evaluation

the score out of 20 is distributed according to the tasks assigned to the student, such as daily preparation, daily exams, oral and monthly exams, written tests, reports, etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; ۲۰۱۵
Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; ۲۰۱۵
Recommended books and references (scientific journals, reports...)	Leroy G. Wade - Organic Chemistry- Pearson (2016)

Course Description Form

1. Course Name:	
Organic Chemistry II	
2. Course Code: PHC211	
3. Semester / Year:	
first semester – second stage	
4. Description Preparation Date:	
2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45hour/ 2 credit	
7. Course administrator's name (mention all, if more than one name)	
Name: dr. Ahmad thamer + dr. ghassan.qais Email: ahmad.thamer@nahrainuniv.edu.iq dr.ghassan.qais@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	1- How to handle organic chemical compounds and their reactions. 2- How to handle scientific equipment. 3- Learning using various scientific techniques. 4- Knowledge of methods used in preparing organic compounds.
9. Teaching and Learning Strategies	

Strategy	• Lectures, homework, tests, practical lab • Preparation of various chemical compounds and medicines • Identifying chemical compounds, medicines, and their derivatives • Conducting chemical analyses
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3-1	6		Alkyl halides.	Lectures	Oral and written exam
3-4	5		Stereochemistry II.	Lectures	Oral and written exam
7-5	12		Aldehydes and ketones (include also aldol and Claisen Condensation); Classification reactions and properties.	Lectures	Oral and written exam
9-8	5		Carboxylic acids: Properties and reactions.	Lectures	Oral and written exam
11-10	6		Functional derivatives of carboxylic acids.	Lectures	Oral and written exam
13-12	6		Amines I and II.	Lectures	Oral and written exam
15-14	5		Amines I and II.	Lectures	Oral and written exam

11. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%
 *(20% midterm exam + daily exams)
 Final exam: 60% theoretical only
 Final grade: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomson learning; CA,USA; 2015
Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomson learning; CA,USA; 2015

Recommended books and references (scientific journals, reports...)	Leroy G. Wade - Organic Chemistry-Pearson (2016)
Electronic References, Websites	

Course Description Form

1. Course Name:	
Practical Organic Chemistry II	
2. Course Code: PHC211	
3. Semester / Year:	
first semester- second stage	
4. Description Preparation Date:	
2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hour/ 1 credit	
7. Course administrator's name (mention all, if more than one name)	
Name: lecturer soura read Email: soura.hammoudy@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	1- Conducting scientific experiments 2- Acquiring skills in drug preparation 3- Granting confidence to the student through presenting scientific research 4- Acquiring the skill of detecting and classifying drugs

9. Teaching and Learning Strategies

Strategy	1- How to handle organic chemical compounds and their reactions. 2- How to handle scientific equipment. 3- Learning through the use of various scientific techniques. 4- Understanding the methods used in the preparation of organic compounds
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4		Determination solubility class	Practical	Known sample
3-4	4		Determination of solubility class	Practical	Quiz and unknown
5-6	4		Identification of alcohols	Practical	Known sample
7-8	4		Identification of alcohols	Practical	Quiz and unknown
8-9	4		Identification of phenols	Practical	Known sample
10-11	4		Identification of phenols	Practical	Quiz and unknown
12-13	4		Identification of aldehydes and ketones	Practical	Known sample
14-15	4		Identification of aldehydes and ketones	Practical	Quiz and unknown

11. Course Evaluation

The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomson learning; CA,USA; 2015
Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd .

	Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; 2015
Recommended books and references (scientific journals, reports...)	Leroy G. Wade - Organic Chemistry- Pearson (2016)
Electronic References, Websites	

Course Description Form

1. Course Name:	
Organic Chemistry III	
2. Course Code: PHC221	
3. Semester / Year:	
second semester- second stage	
4. Description Preparation Date:	
2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45hour/ 2 credit	
7. Course administrator's name (mention all, if more than one name)	
Name: dr ahmad thamer + dr. ghassan gais Email: dr. ahmad.thamer@nahrainuniv.edu.iq dr. ghassan .gais @nahrainuniv.edu.iq	
8. Course Objectives	
	1-how to handle organic chemical compounds and their reactions. 2- How to handle scientific instruments. 3- Learning through the use of various scientific techniques. 4- Understanding the methods used in the preparation of organic compounds.
9. Teaching and Learning Strategies	
Strategy	1-How to deal with chemical compounds

	2- How to deal with scientific equipment 3- Learning using different scientific techniques 4- Knowing the methods used in preparing medicines				
1- Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-4	13		Heterocyclic system: Classes of heterocyclic systems; general structures; properties; Occurrence in nat and in medicinal products.	Lectures	Oral and written exam
5	3		Five-membered ring heterocyclic compounds: pyrrole; furan and thiophen.	Lectures	Oral and written exam
6	3		Source of pyrrole, furan and thiophen.	Lectures	Oral and written exam
9-7	8		Electrophilic substitution in pyrrole, furan and thiophen: Reactivity and orientation.	Lectures	Oral and written exam
10	2		Six-membered ring heterocyclic compounds: Structure of pyridine.	Lectures	Oral and written exam
11	1		Basicity of pyridine.	Lectures	Oral and written exam
13-11	7		Reactions of pyridine.	Lectures	Oral and written exam
15-14	8		Saturated five-membered heterocyclic compounds.	Lectures	Oral and written exam
2- Course Evaluation					
Annual assessment: 40%, theoretical exam: 20% + practical exam: 20% *(20% midterm exam + daily exams) Final exam: 60% theoretical only Final grade: 100%					
3- Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition.		

	Organic Chemistry by J. McMurry, latest ed., Thomson learning, CA, USA
Main references (sources)	An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
Recommended books and references (scientific journals, reports...)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomson learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
Electronic References, Websites	

Course Description Form

10.	Course Name:
	Practical Organic Chemistry III
11.	Course Code: PHC221
12.	Semester / Year:
	second semester- second stage
13.	Description Preparation Date:
	2025
14.	Available Attendance Forms:
	Attendance
15.	Number of Credit Hours (Total) / Number of Units (Total)
	30hour/ \ credit
16.	Course administrator's name (mention all, if more than one name)
	Name: lecturer soura read Email: soura.hammoudy@nahrainuniv.edu.iq

17. Course Objectives					
			1- Preparation of chemical compounds and various medications. 2-Identification of chemical compounds, medications, and their derivatives. 3-Performing chemical analyses.		
18. Teaching and Learning Strategies					
Strategy	1-Acquiring the skill in preparing compounds and medications. 2- Acquiring the skill in using various methods for manufacturing and preparing medications. 3- Acquiring the skill in handling chemical compounds. 4- Acquiring the skill in writing scientific reports.				
4- Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	2		Identification of carboxylic acid	Practical	known sample
3 – 4	4		Identification of carboxylic acid	Practical	quiz and unknown
5 -6	4		Identification of Alkyl and Aryl Halides	Practical	known sample
7-8	4		Identification of Alkyl and Aryl Halides	Practical	quiz and unknown
8 – 9	4		Salts of carboxylic acids	Practical	known sample
10 -11	4		Salts of carboxylic acids	Practical	quiz and unknown
12 -13	4		Classification of reactions of amines	Practical	known sample
14 -15	4		Classification of reactions of amines	Practical	quiz and unknown
5- Course Evaluation					
The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.					

6- Learning and Teaching Resources

Required textbooks (curricular books, if any)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomson learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomson learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
Recommended books and references (scientific journals, reports...)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomson learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
Electronic References, Websites	

Course Description Form

1. Course Name: Inorganic Pharmaceutical Chemistry					
2. Course Code: PHC311					
3. Semester / Year: first semester – third stage					
4. Description Preparation Date: 2025					
5. Available Attendance Forms: attendance					
6. Number of Credit Hours (Total) / Number of Units (Total) 45 hr / 3 credit					
7. Course administrator's name (mention all, if more than one name)					
Name: assist. Lecturer Tiba M. Hameed Email: teba.majed@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives			1– Introducing students to inorganic pharmaceutical chemicals 2. Understanding the risks of these compounds 3. Understanding how to treat illnesses related to inorganic chemical poisoning		
9. Teaching and Learning Strategies					
Strategy	Studying the inorganic pharmaceutical compounds like ions and chelates in order to understand the pathological conditions associated with the increase or decrease of these compounds . in addition to studying the GIT- related disorders and topical agents				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-3	6	Knowing structural formula of atoms, molecules and complexes.	Structural formula of atoms, molecules and complexes	Lectures	Oral and written exam
4,5	4	Knowing the essential and non-essential elements	Studying the essential and non-essential elements	Lectures	Oral and written exam
6,7	4	Knowledge of inorganic compounds used in the treatment of gastrointestinal disorders	Knowledge of inorganic compounds used in the treatment of gastrointestinal disorders	Lectures	Oral and written exam
8	2	Knowledge of inorganic compounds used in topical treatment	Studying the inorganic compounds used in topical treatment	Lectures	Oral and written exam
9	2	Knowledge of inorganic compounds used in dental treatment	Studying the inorganic compounds used in dental treatment	Lectures	Oral and written exam
10-12	6	Knowledge of radioactive preparations	Studying the radioactive preparations	Lectures	Oral and written exam
13-15	6	Knowledge of inorganic compounds used in radioactive preparations.	Studying the inorganic compounds used in radioactive preparations.	Lectures	Oral and written exam

11. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition

Wilson and Gisvold; Textbook of Organic medicinal and

	Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Main references (sources)	Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Recommended books and references (scientific journals, reports...)	Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition
Electronic References, Websites	

Course Description Form

1. Course Name: Practical Inorganic Pharmaceutical Chemistry
2. Course Code: PHC311

3. Semester / Year: first semester – third stage

4. Description Preparation Date: 2025

5. Available Attendance Forms: attendance

6. Number of Credit Hours (Total) / Number of Units (Total) 30 hr / 1 credit

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

Name: Dr.Rawa Muhsen

Email: dr.rawa.muhsen@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives

Inorganic Pharmaceutical Chemistry: The study of inorganic chemical compounds and their uses in medical diagnosis and treatment, and teaching students how to estimate inorganic compounds and drugs.

9. Teaching and Learning Strategies

Strategy

- 1 - Acquire skills in preparing compounds and medicines
- 2 - Acquire skills in using different methods in manufacturing and preparing medicines
- 3 - Acquire skills in handling chemical compounds
- 4 - Acquire skills in writing scientific reports and conducting scientific experiments
- 5 - Build student confidence through presenting scientific research
- 6 - Acquire skills in detecting, classifying, and evaluating medicines

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
٢-١	٤	Definition and application in the medical and pharmaceutical field	Preparation and standardization of HCl (known sample, and unknown).	procedures	Oral and written exams
٤-٣	٤	Definition and application in the medical and pharmaceutical field	Preparation and standardization of	procedures	Oral and written exams

			1NaOH(known sample, quiz and unknown).		
٥-٦	٤	Definition and application in the medical and pharmaceutical field	Assay of NaOH solution (unknown sample known)	procedures	Oral and written exams
٨-٧	٤	Definition and application in the medical and pharmaceutical field	Assay of copper sulfate (known sample, unknown sample).	procedures	Oral and written exams
١١-٩	٤	Definition and application in the medical and pharmaceutical field	Assay of Borax (explanation of basic concepts, quiz and unknown).	procedures	Oral and written exams
١٢-١٣	٤	Definition and application in the medical and pharmaceutical field	Assay of citric acid (known sample, unknown sample).	procedures	Oral and written exams
١٤-١٥	٤	Definition and application in the medical and pharmaceutical field	Assay of magnesium hydroxide (known sample (quiz and unknown))	procedures	Oral and written exams

11. Course Evaluation

The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Main references (sources)	Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Recommended books and references (scientific journals, reports...)	Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition
Electronic References, Websites	

Course Description Form

1. Course Name: organic Pharmaceutical Chemistry I
2. Course Code: PHC321
3. Semester / Year: second semester – third stage

4. Description Preparation Date: 2025					
5. Available Attendance Forms: attendance					
6. Number of Credit Hours (Total) / Number of Units (Total) 45 hr / 4 credit					
7. Course administrator's name (mention all, if more than one name)					
Name: assist. Lecturer Tiba M. Hameed Email: teba.majed@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives			1- Study the distribution properties of drugs 2- Identify the acidic and basic properties of pharmaceutical compounds 3- Identify the QSAR of the drugs 4- Study metabolic reactions in details		
9. Teaching and Learning Strategies					
Strategy	1- Understand the methods of drug distribution and the factors affecting it. 2- Understand the acidity and basicity of pharmaceutical compounds. 3- Learn about metabolic reactions and the fate of pharmaceutical compounds within the body.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-7	21	Identify the effect of physical and chemical properties on drug efficacy, such as drug diffusion, binding proteins, types of these bindings, and types of drug receptor proteins.	Identify the effect of physical and chemical properties on drug efficacy	Lectures	Oral and written exam
8-15	24	Knowledge of the metabolism of organic compounds and drugs in the body	Knowledge of the metabolism of organic compounds and drugs in the body	Lectures	Oral and written exam
11. Course Evaluation					
Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%					

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Recommended books and references (scientific journals, reports...)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Electronic References, Websites	

Course Description Form

1. Course Name: Practical Organic Pharmaceutical Chemistry I
2. Course Code: PHC321
3. Semester / Year: second semester – third stage

4. Description Preparation Date: 2025					
5. Available Attendance Forms: attendance					
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hr / 1credit					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr.Rawa Muhsen					
Email: : dr.rawa.mohsen@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives			Organic Pharmaceutical Chemistry includes the study of organic chemical compounds and their uses in medical diagnosis and treatment, and teaching students how to estimate organic compounds and drugs.		
9. Teaching and Learning Strategies					
Strategy	1 - Gaining skills in preparing compounds and medicines 2 - Gaining skills in using different methods in manufacturing and preparing medicines 4 - Gaining skills in handling chemical compounds 4 - Gaining skills in writing scientific reports and conducting scientific experiments 5 - Building student confidence through presenting scientific research 6 - Gaining skills in detecting, classifying, and evaluating medicines				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
٢-١	٤	Definition and application in the medical and pharmaceutical field	Preparation and standardization of 0.1KMnO4 (known sample, quiz and unknown).	procedures	Oral and written e
٤-٣	٤	Definition and application in the medical and pharmaceutical field	Assay of hydrogen peroxide solution (known sample, quiz and unknown)	procedures	Oral and written e
٥-٦	٤	Definition and application in the medical and pharmaceutical field	Assay of ferrous sulfate (known sample And unknown sample)	procedures	Oral and written e
٨-٧	٤	Definition and application in the medical and pharmaceutical field	Preparation and standardization of 0.1Na2S2O4 solution (known, quiz and unknown sample).	procedures	Oral and written e

١١-٩	٤	Definition and application in the medical and pharmaceutical field	Assay of Chlorinated Lir (known sample, quiz and unknown).	procedures	Oral and written e
١٢-١٣	٤	Definition and application in the medical and pharmaceutical field	Preparation and assay of Lugol's Solution (known sample, quiz and unknown)	procedures	Oral and written e
١٤-١٥	٤	Definition and application in the medical and pharmaceutical field	Assay of Ascorbic Acid (Vit. C) (known sample, quiz and unknown)	procedures	Oral and written e

11. Course Evaluation

The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Recommended books and references (scientific journals, reports...)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Electronic References, Websites	

Course Description Form

24.	Course Name: Organic Pharmaceutical Chemistry II
25.	Course Code: PHC412
26.	Semester / Year: first semester – forth stage
27.	Description Preparation Date: 2025
28. Available Attendance Forms: attendance	
29. Number of Credit Hours (Total) / Number of Units (Total) 45 hr / 3 credit	
30.	Course administrator's name (mention all, if more than one name)
Name: assist. Lecturer Kanar Muthana Chyad Kanar.muthana@nahrainuniv.edu.iq Name: assist. Lecturer Asmaa Adnan Abdul-nabi asmaa.adnan@nahrainuniv.edu.iq	
31.	Course Objectives
Course Objectives	1- How to handle chemical compounds 2- How to handle scientific equipment 3- Learning how to use various scientific techniques 4- Understanding the factors that affect the stability, solubility, and absorption of drugs

		5- Understanding the mechanism of drug action and the relationship between chemical composition and this 6- Understanding the methods used in drug preparation			
32. Teaching and Learning Strategies					
Strategy	1. Acquire skills in preparing compounds and medicines. 2. Acquire skills in using various methods in manufacturing and preparing medicines. 3. Acquire skills in handling chemical compounds. 4. Acquire skills in writing scientific reports.				
33. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
٤-١	12	Knowledge of medications used to treat disorders of the cholinergic system, the adrenergic system, and the nervous system.	Drugs used to treat cholinergic system disorders	Lectures	Oral and written exam
٨-٥	12	2. Knowledge of steroid and nonsteroidal hormones.	Drugs used to treat adrenergic system disorders	Lectures	Oral and written exam
١١-٩	9		analgesics	Lectures	Oral and written exam
١٤-١٢	9		Medicines used in the nervous system	Lectures	Oral and written exam
١٥	3		Steroid and nonsteroidal hormones	Lectures	Oral and written exam
34. Course Evaluation					
Annual assessment: 40%, theoretical exam: 20% + practical exam: 20% *(20% midterm exam + daily exams) Final exam: 60% theoretical only Final grade: 100%					
35. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition		

Main references (sources)	Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

13.	Course Name: Practical Organic Pharmaceutical Chemistry II
14.	Course Code: PHC412
15.	Semester / Year: first semester – forth stage
16.	Description Preparation Date: 2025
17.	Available Attendance Forms: attendance
18.	Number of Credit Hours (Total) / Number of Units (Total) 30 hr / 1 credit
19.	Course administrator's name (mention all, if more than one name) Name: assist. Lecturer Kany Azad Email: kany.azad@nahrainuniv.edu.iq
20.	Course Objectives
Course Objectives	1. Knowledge of drug and chemical compound design methods. 2. Knowledge of laboratory synthesis methods for drugs and chemical compounds. 3. Learning laboratory analysis methods to determine the composition of chemical compounds. 4. Preparation of various drugs.

21. Teaching and Learning Strategies					
Strategy	1- Conducting scientific experiments 2- Gaining skills in preparing medicines 3- Building student confidence through conducting scientific research 4- Gaining skills in identifying and classifying medicines				
22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Definition and application in the pharmaceutical field	Preparation of salicylic acid.	Theoretical and practical lectures	Practical, written, and oral exams. In addition to reports.
2	2	Definition and application in the pharmaceutical field	Re-crystallization of salicylic acid.	Theoretical practical lectures	Practical, written, and oral exams.
3	2	Definition and application in the pharmaceutical field	Synthesis of aspirin.	Theoretical practical lectures	In addition to reports.
4	2	Definition and application in the pharmaceutical field	Re-crystallization of aspirin.	Theoretical practical lectures	Practical, written, and oral exams.
5	2	Definition and application in the pharmaceutical field	Assay of aspirin (known sample).	Theoretical practical lectures	In addition to reports.
6	2	Definition and application in the pharmaceutical field	Assay of aspirin (unknown sample).	Theoretical practical lectures	Practical, written, and oral exams.
7	2	Definition and application in the pharmaceutical field	Preparation of nitrobenzene.	Theoretical practical lectures	In addition to reports.
8	2	Definition and application in the pharmaceutical field	Preparation of aniline.	Theoretical practical lectures	Practical, written, and oral exams.
9	2	Definition and application in the pharmaceutical field	Preparation of acetanilide	Theoretical practical lectures	In addition to reports.
10	2	Definition and application in the pharmaceutical field	Re-crystallization of acetanilide.	Theoretical practical lectures	Practical, written, and oral exams.
11	2	Definition and application in the pharmaceutical field	Chlorosulfonation of acetanilide.	Theoretical practical lectures	In addition to reports.
12	2	Definition and application in the pharmaceutical field	Amination of <i>p</i> -chlorobenzenesulfonyl chloride.	Theoretical practical lectures	Practical, written, and oral exams.

13	2	Definition and application in the pharmaceutical field	Hydrolysis of <i>p</i> -chlorobenzenesulfonyl chloride to sulfanilamide	Theoretical practical lectures	In addition reports.
14	2	Definition and application in the pharmaceutical field	Assay of sulfa drugs (known sample).	Theoretical practical lectures	Practical, written, and exams.
15	2	Definition and application in the pharmaceutical field	Assay of sulfa drugs (unknown sample).	Theoretical practical lectures	Practical, written, and exams.

23. Course Evaluation

The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Recommended books and references (scientific journals, reports...)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Electronic References, Websites	

Course Description Form

1. Course Name: Organic Pharmaceutical Chemistry III					
2. Course Code: PHC422					
3. Semester / Year: second semester – forth stage					
4. Description Preparation Date: 2025					
5. Available Attendance Forms: attendance					
6. Number of Credit Hours (Total) / Number of Units (Total) 45 hr / 3 credit					
7. Course administrator's name (mention all, if more than one name)					
Name: assist. Lecturer Kanar Muthana Chyad Kanar.muthana@nahrainuniv.edu.iq Name: assist. Lecturer Asmaa Adnan Abdul-nabi asmaa.adnan@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives			Study of drug discovery and development and the relationship between chemical structure and efficacy		
9. Teaching and Learning Strategies					
Strategy	1- How to handle chemical compounds 2- How to handle scientific equipment 3- Learning how to use various scientific techniques 4- Understanding the factors that affect the stability, solubility, and absorption of drugs 5- Understanding the mechanism of drug action and the relationship between chemical composition and this 6- Understanding the methods used in drug preparation				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
٦-١	١٨	Identifying antibiotic carcinogens, and sulfonamides	antibiotics	Lectures	Oral and written exams
٨-٧	6		sulfonamide	Lectures	Oral and written exams
١٥-٩	21		Anticancer agents	Lectures	Oral and written exams

11. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Main references (sources)	Wilson and Gisvold; Textbook of Organic medicinal and Pharmaceutical chemistry; Delgado JN, Remers WA, (eds); latest edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name: Practical Organic Pharmaceutical Chemistry III					
2. Course Code: PHC422					
3. Semester / Year: second semester – forth stage					
4. Description Preparation Date: 2025					
5. Available Attendance Forms: attendance					
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hr / 1 credit					
7. Course administrator's name (mention all, if more than one name)					
Name: assist. Lecturer Kany Azad					
Email: kany.azad@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives	1- How to handle chemical compounds 2- How to handle scientific equipment 3- Learning how to use various scientific techniques 4- Understanding the factors that affect the stability, solubility, and absorption of drugs 5- Understanding the mechanism of drug action and the relationship between chemical composition and this 6- Understanding the methods used in drug preparation				
9. Teaching and Learning Strategies					
Strategy	1- Conducting scientific experiments 2- Gaining skills in preparing medicines 3- Building student confidence through presenting scientific research 4- Gaining skills in identifying and classifying medicines				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Definition and application in the pharmaceutical field	Cannizaro reaction (part I).	Theoretical and practical lectures	Practical, written, and oral exams. In addition to reports.
2	2	Definition and application in the pharmaceutical field	Cannizaro reaction (part II).	Theoretical practical lectures	Practical, written, and oral exams.
3	2	Definition and application in the pharmaceutical field	Re-crystallization of benzoic acid.	Theoretical practical lectures	In addition to reports.
4	2	Definition and application in the pharmaceutical field	Assay of ascorbic acid (known sample).	Theoretical practical lectures	Practical, written, and oral exams.
5	2	Definition and application in the pharmaceutical field	Assay of ascorbic acid (unknown sample).	Theoretical practical lectures	In addition to reports.
6-7	2	Definition and application in the pharmaceutical field	Synthesis of Phenol.	Theoretical practical lectures	Practical, written, and oral exams.
8	2	Definition and application in the pharmaceutical field	Assay of phenol (known sample).	Theoretical practical lectures	In addition to reports.
9	2	Definition and application in the pharmaceutical field	Assay of phenol (unknown sample).	Theoretical practical lectures	Practical, written, and oral exams.
10-11	2	Definition and application in the pharmaceutical field	Synthesis of chlorbutane	Theoretical practical lectures	In addition to reports.
12-14	2	Definition and application in the pharmaceutical field	Synthesis of paracetamol	Theoretical practical lectures	Practical, written, and oral exams.
15	2	Definition and application in the pharmaceutical field	Synthesis of Phenol.	Theoretical practical lectures	In addition to reports.

11. Course Evaluation

The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
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Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Recommended books and references (scientific journals, reports...)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
Electronic References, Websites	

Course Description Form

36. Course Name:	
Organic Pharmaceutical Chemistry IV	
37. Course Code: PHC511	
38. Semester / Year:	
1 st Semester / 5 th Year	
39. Description Preparation Date:	
2025	
40. Available Attendance Forms:	
In-person	
41. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours (theoretical and practical) / 2 Units	
42. Course administrator's name (mention all, if more than one name)	
Name: Assistant lecturer Asmaa Adnan Email: asmaa.adnan@nahrainuniv.edu.iq Name: Assistant lecturer Kanar Muthanna Email: Kanar.muthana@nahrainuniv.edu.iq	
43. Course Objectives	
Course Objectives	1– Knowledge of drug and chemical compound design methods

	2– Knowledge of methods for dispensing with drugs and chemical compounds in the laboratory 3– Learning laboratory analysis methods for synthesizing chemical compounds 4– Preparation of various drugs
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44. Teaching and Learning Strategies

Strategy	1- How to handle chemical compounds 2- How to handle scientific equipment 3- Learning how to use various scientific techniques 4- Understanding the factors that affect the stability, solubility, and absorption of drugs 5- Understanding the mechanism of drug action and the relationship between chemical composition and this 6- Understanding the methods used in drug preparation
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45. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	1. Understand the basic concepts of pharmaceutical formulations	Basic concepts of pharmacological introductions	Lectures	Oral and written exam
4-6	6	2. Understand the basic concepts of polymeric pharmaceutical formulations	Polymeric pharmaceutical precursors	Lectures	Oral and written exam
7-8	4	3. Computer-aided drug design	Targeted medication	Lectures	Oral and written exam
9-10	5		Reports	Lectures	Oral and written exam
11-15	5		Use of computers drug design	Lectures	Oral and written exam

46. Course Evaluation

Annual assessment 30%, theoretical exam 30%

*(30% midterm exam + daily exams)

Final exam 70% theoretical only

Final grade 100%

47. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Organic medicinal Pharmaceutical chemistry, Delgado JN, Remers WA, (E 12th ed, 2011
Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
Recommended books and references (scientific journals, reports...)	Wilson and Gisvold Textbook of Organic medicinal Pharmaceutical chemistry, Delgado JN, Remers WA, (E last edition.

Electro nic References, Websites	
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Course Description Form

48.	Course Name:	Advanced Pharmaceutical Analysis
49.	Course Code: PHC524	
50.	Semester / Year:	2 ^{ed} Semester / 5 th Year
51.	Description Preparation Date:	2025
52.	Available Attendance Forms:	In-person
53.	Number of Credit Hours (Total) / Number of Units (Total)	45 hours (theoretical and practical) / 3 Units
54.	Course administrator's name (mention all, if more than one name)	Name: Professor Dr. Mohammed Jasim Email: dr.mohammed.jasim@nahrainuniv.edu.iq Name: Assistant Professor Dr. Ahmed Thamer Email: dr.ahmad.thamer@nahrainuniv.edu.iq
55.	Course Objectives	
Course Objectives		1– How to handle chemical compounds 2– How to handle scientific equipment 3– Learning how to use various scientific techniques

	4- Understanding the factors that affect the stability, solubility, and absorption of drugs 5- Understanding the mechanism of drug action and the relationship between chemical composition and this 6- Understanding the methods used in drug preparation
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56. Teaching and Learning Strategies

Strategy	1- Gaining skills in preparing compounds and medicines 2 - Gaining skills in using different methods in manufacturing and preparing medicines 4 - Gaining skills in handling chemical compounds 4 - Gaining skills in writing scientific reports and conducting scientific experiments 5 - Building student confidence through presenting scientific research 6 - Gaining skills in detecting, classifying, and evaluating medicines
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57. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
٢-١	6	1.Using ultraviolet radiation to detect and identify compounds	Using ultraviolet l to detect and iden compounds	Lectures	Oral and written exam
4-8	14	2. Using infrared radiation to detect and identify compounds	Using infrared to de and identify vehicles Targeted medicati	Lectures	Oral and written exam
8-10	12	3. Using magnetic resonance imaging to detect and identify compounds	Using magnetic resonance imagin detect and identify vehicles	Lectures	Oral and written exam
11-14	11	4. Using mass spectrometry to detect and identify compounds	Using mass measurement to detect and identify compounds	Lectures	Oral and written exam
15	2	5. Elemental analysis	Element analysis	Lectures	Oral and written exam

58. Course Evaluation

Annual assessment: 40%, theoretical exam: 20% + practical exam: 20%

*(20% midterm exam + daily exams)

Final exam: 60% theoretical only

Final grade: 100%

59. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Spectrometric Identification of Organic Compounds Silverstein, Bassler and Morrill. Applications of absorption spectroscopy of orga compounds by Dyer JR. Organic Chemistry by McMurry; 5thed; Thomason learn CA, USA 2000.
Main references (sources)	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill.

	Applications of absorption spectroscopy of organic compounds by Dyer JR. Organic Chemistry by McMurry; 5th ed; Thomson learning CA, USA 2000.
Recommended books and references (scientific journals, reports...)	Organic Chemistry by McMurry; last edition.
Electro nic References, Websites	

Course Description Form

60. Course Name:	
Advanced Pharmaceutical Analysis (Practical)	
61. Course Code: PHC524	
62. Semester / Year:	
2 ^{ed} Semester / 5 th Year	
63. Description Preparation Date:	
2025	
64. Available Attendance Forms:	
In-person	
65. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours (theoretical and practical) / 1 Units	
66. Course administrator's name (mention all, if more than one name)	
Name: Assistant Lecturer Hussein Nasser Email: Hussein.Naser@nahrainuniv.edu.iq	
67. Course Objectives	
Course Objectives	Advanced Pharmaceutical Analysis: Study of spectroscopic methods and use in identifying organic compounds.
68. Teaching and Learning Strategies	
Strategy	1- Gaining skills in preparing compounds and medicines 2 - Gaining skills in using different methods in manufacturing and preparing medicines 4 - Gaining skills in handling chemical compounds

	4 - Gaining skills in writing scientific reports and conducting scientific experiments 5 - Building student confidence through presenting scientific research 6 - Gaining skills in detecting, classifying, and evaluating medicines				
69. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Definition and application in the field of advanced pharmaceutical analysis	Introduction & demonstration to visible spectrophotometry	Practical	Oral and written exam
2	2		Absorption spectra of known colored solution	Practical	Oral and written exam
3	2		Absorption spectra of unknown colored solution	Practical	Oral and written exam
4	2		Beer's law plot of known solution.	Practical	Oral and written exam
5	2		Beer's law plot of known solution.	Practical	Oral and written exam
6	2		Colorimetric assay tetracycline (FeCl ₃ known sample).	Practical	Oral and written exam
7	2		Colorimetric assay tetracycline (FeCl ₃ unknown sample)	Practical	Oral and written exam
8	2		Colorimetric assay tetracycline (acid), known sample	Practical	Oral and written exam
9	2		Colorimetric assay tetracycline (acid), unknown sample	Practical	Oral and written exam
10	2		Colorimetric assay streptomycin (mal known sample).	Practical	Oral and written exam
11	2		Colorimetric assay streptomycin (mal unknown sample)	Practical	Oral and written exam
12	2		Colorimetric assay streptomycin (oxidized, known sample).	Practical	Oral and written exam
13	2		Colorimetric assay streptomycin (oxidized, unknown sample).	Practical	Oral and written exam
14	2		Colorimetric assay tetracycline (basic, known sample)	Practical	Oral and written exam
15	2				

			Colorimetric assay tetracycline (basic unknown sample)		
70. Course Evaluation					
The grade is distributed out of 20 based on the tasks assigned to the student, such as daily preparation, daily exams, oral and written exams, reports, etc.					
71. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Spectrometric Identification of Organic Compounds Silverstein, Bassler and Morrill. Applications of absorption spectroscopy of organic compounds by Dyer JR. Organic Chemistry by McMurry; 5th ed; Thomson Learning CA, USA 2000.		
Main references (sources)			Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill. Applications of absorption spectroscopy of organic compounds by Dyer JR. Organic Chemistry by McMurry; 5th ed; Thomson Learning CA, USA 2000.		
Recommended books and references (scientific journals, reports...)			Organic Chemistry by McMurry; last edition.		
Electronic References, Websites					

Course Description Form

72. Course Name:	
Advanced Analytical Chemistry	
73. Course Code: PHG114	
74. Semester / Year:	
1 st Semester / Master	
75. Description Preparation Date:	
2025	
76. Available Attendance Forms:	
In-person	
77. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours (theoretical and practical) / 2 Units	
78. Course administrator's name (mention all, if more than one name)	
Name: Professor Dr. Mohammed Jasim Email: dr.mohammed.jasim@nahrainuniv.edu.iq	
79. Course Objectives	
Course Objectives	1– Knowledge of automated analytical methods in pharmaceutical analysis. 2– Knowledge of how to develop analytical methods and study how to select the appropriate method.

	3- Knowledge of the theoretical and scientific foundations of each analytical technique. 4- Knowledge of the quantitative and qualitative estimation of each chemical and pharmaceutical compound.
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80. Teaching and Learning Strategies

Strategy	1- Acquire skills in chemical and pharmaceutical analysis techniques. 2- A detailed explanation of each analytical method. 3- How to evaluate each analytical method. 4- Conduct a daily exam and discuss each analytical method. 5- Conduct a semester exam on all methods explained.
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81. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3	6	Basic concepts of the method of separation of chemical and pharmaceutical compounds using liquid chromatography and understanding the theoretical foundations of this analytical method.	High performance liquid chromatography	Lectures	Midterm and daily exams and final assessment
4,5,6	6	Basic theoretical and practical concepts, separation method, and applications of gas chromatography	Gas chromatography	Lectures	Midterm and daily exams and final assessment
8-10	8	Understand the method of diagnosing pharmaceutical and chemical compounds using infrared spectroscopy, with an understanding of the theoretical foundations and practical applications of this method.	infrared spectroscopy	Lectures	Midterm and daily exams and final assessment
8-10	6	Basic theoretical and practical concepts of quantitative and qualitative analysis and diagnosis using UV-Vis spectroscopy	UV-Visible Spectroscopy	Lectures	Midterm and daily exams and final assessment
11-13	4	Basic concepts of quantitative analysis and theoretical foundations for the analysis and separation of pharmaceutical and chemical compounds using thin layer chromatography.	thin layer chromatography	Lectures	Midterm and daily exams and final assessment

82. Course Evaluation

Annual effort: 30%

*(25% midterm exam + 5% daily exams)

Final exam: 70% theoretical only

Final grade: 100%

83. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Fundamentals of Analytical Chemistry(EIGHTH EDITION) Douglas A. Skoog • Donald M. West F. James Holler Stanley R. Crouch • Chemical Analysis Modern Instrumentation Methods and Techniques (Second Edition) Francis Rouessac and Annick Rouessac
Main references (sources)	• Fundamentals of Analytical Chemistry (EIGHTH EDITION) Douglas A. Skoog Donald M. West F. James Holler Stanley R. Crouch • Chemical Analysis Modern Instrumentation Methods and Techniques (Second Edition) Francis Rouessac and Annick Rouessac
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

84.	Course Name:				
	Advanced Organic Chemistry				
85.	Course Code: PHG124				
86.	Semester / Year:				
	2 ^{ed} Semester / Master				
87.	Description Preparation Date:				
	2025				
88.	Available Attendance Forms:				
	In-person				
89.	Number of Credit Hours (Total) / Number of Units (Total)				
	30 hours (theoretical and practical) / 2 Units				
90.	Course administrator's name (mention all, if more than one name)				
	Name: Assistant Professor Dr. Ahmed Thamer Email: dr.ahmad.thamer@nahrainuniv.edu.iq				
91.	Course Objectives				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Course Objectives</td> <td> 1- Methods for preparing heterocyclic compounds 2- Knowing the nomenclature of heterocyclic compounds 3- Mechanisms for preparing heterocyclic compounds 4- Some cyclic compounds used in the pharmaceutical industry </td> </tr> </table>	Course Objectives	1- Methods for preparing heterocyclic compounds 2- Knowing the nomenclature of heterocyclic compounds 3- Mechanisms for preparing heterocyclic compounds 4- Some cyclic compounds used in the pharmaceutical industry		
Course Objectives	1- Methods for preparing heterocyclic compounds 2- Knowing the nomenclature of heterocyclic compounds 3- Mechanisms for preparing heterocyclic compounds 4- Some cyclic compounds used in the pharmaceutical industry				
92.	Teaching and Learning Strategies				

Strategy	Lectures Midterm Exam Surprise Questions Brainstorming Final Exam				
93. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Naming and preparing tricyclic rings		
2	2		Preparation mechanics		
3	2		Naming and preparing quadrilateral rings		
4	2		Preparation mechanics		
5	2		Naming and preparing pentagonal rings		
6	2		Preparation mechanics		
7	2		Naming and preparing hexagonal rings		
8	2		Preparation mechanics		
	2				

9			Aromatic cyclic compounds		
10	2		Naming aromatic rings		
11	2		Methods of preparing aromatic compounds		
12	2		Unsaturated compounds and their naming		
13	2		Preparation of unsaturated compounds		
14	2		Exam		
15	2		Final Exam		

94. Course Evaluation

Annual effort: 30%

*(25% midterm exam + 5% daily exams)

Final exam: 70% theoretical only

Final grade: 100%

95. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Chemistry of heterocyclic compounds Acheson or paket
Main references (sources)	Chemistry of heterocyclic compounds Acheson or paket
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

96. Course Name:					
Lab Instrument Techniques					
97. Course Code: PHG121					
98. Semester / Year:					
2 ^{ed} Semester / Master					
99. Description Preparation Date:					
2025					
100. Available Attendance Forms:					
In-person					
101. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours (theoretical and practical) / 2 Units					
102. Course administrator's name (mention all, if more than one name)					
Name: Professor Dr. Mohammed Jasim Email: dr.mohammed.jasim@nahrainuniv.edu.iq Name: Professor Dr. Nadira Salman Name: Assistant Professor Dr. Ahmed Thamer Email: dr.ahmad.thamer@nahrainuniv.edu.iq					
103. Course Objectives					
Course Objectives			1- Teaching students to the devices used to measure and analyze chemicals and drugs, such as spectrophotometers, infrared rays, and nuclear magnetic resonance. 2- Teaching and training students on some of the techniques used in laboratory testing, such as ELISA.		
104. Teaching and Learning Strategies					
Strategy	Teaching methods in the Lab instrument technique course focus on explaining topics in a detailed, interactive manner, including student assessment through daily and monthly tests as well as a final exam.				
105. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1,2	4		Magnetic resonance spectroscopy	Lectures	Midterm and daily exams and final assessment
3,4	4		Mass spectroscopy		
5,6,7	6		Atomic absorption spectroscopy	Lectures	Midterm and daily exams and final assessment
8,9,10	6		PH measurement	Lectures	Midterm and daily exams and final assessment
11,12,13	4		Thermal gravimetric analysis	Lectures	Midterm and daily exams and final assessment
14			The role of the enzyme-linked immunosorbent assay in detection	Lectures	Midterm and daily exams and final assessment
15			Exploring the role of conventional and real time PCR in modern pharmacy	Lectures	Midterm and daily exams and final assessment

106. Course Evaluation

Annual effort: 30%

*(25% midterm exam + 5% daily exams)

Final exam: 70% theoretical only

Final grade: 100%

107. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Analytical Chemistry Stoek and West.
Main references (sources)	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill.

	Tevfik Dorak M . Real – Time PCR. 1st Edition.© 2006 by Taylor & Francis Group. London .https://www.gene-quantification.de/dorak-book-real-time-pcr-2006. Sakshi pandey. 2021. METHODS AND APPLICTION OF ELISA.times of agriculture.In .Issue 18.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	