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

Academic Program Specification Form for The Academic

University: Alnahrain university
College: collage of pharmacy
Number Of Departments In The College: Date of Form Completion:

Dean's Name
Date : / /

Signature

Dean's Assistant For Scientific Affairs

Date : / /
Signature

The College Quality Assurance And University Performance Manager
Date : 20/ 7 / 2023
Signatur

Quality Assurance And University Performance Manager Date : / /
Signature

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

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

1. Teaching Institution	Ministry of Higher Education and Scientific Research/ Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Program Title	B.S.c pharmacy
4. Title of Final Award	B.S.c
5. Modes of Attendance offered	Courses
6. Accreditation	Ministry of Higher Education and Scientific Research
7. Other external influences	Practical part/ search
8. Date of production/revision of this specification	15/11/2022
9. Aims of the Program	
-Teaching students the appropriate and safe ways to deal with chemicals, glassware and devices	
-Teaching students the techniques used to identify different chemicals	
-Teaching students the different techniques and methods used in the manufacture of different chemicals	
-Studying the chemical and physical properties of drugs and chemicals	
-Teaching students how to draw and name the synthetic formula of drugs and chemicals	
-Studying modern methods of designing chemical compounds using modern	

electronic programs
-Teaching students the mechanics of action of drugs and chemicals and studying the effect of changes that take place on the structural formula and chemicals on biological activity, solubility, stability, side effects, duration of drug action

10. Learning Outcomes, Teaching, Learning and Assessment Methods
A. Cognitive goals A1- Correct handling of chemicals and glassware A2- Operate scientific equipment in the correct and appropriate manner A3- Gaining experience in using different techniques for preparing medicines and chemicals A4- Knowledge of the mechanisms of action of drugs A 5- Knowing the factors affecting the biological activity, solubility, stability, side effects, duration of action of the drug A6- Studying the methods of chemical reactions
B. The skills goals special to the programme . B1 - Acquisition of the skill on how to identify and evaluate chemical compounds B2 - Acquisition of skill in the use of various methods of preparation and manufacture of chemical compounds B3- Acquiring the skill in writing scientific reports
Teaching and Learning Methods
1- Theoretical lectures 2- educational laboratories 3- Scientific research 4- desk research
Assessment methods
1- Mid-term and final exams 2- Oral and written exams 3- Laboratory reports
C. Affective and value goals C1- Preparing various medicines and chemical compounds C2- Learn about medicines and their derivatives C3- Performing laboratory analyzes C4- Using modern methods of presenting lectures in the form of slides
Teaching and Learning Methods
1- Teaching and giving electronic or in-person lectures 2- Seminars and homework 3- Scientific research
Assessment methods
Oral exams, written exams, research evaluations, and practical exams

	D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Acquisition of skills in research work D2- Acquisition of leadership skills D3- Acquiring the skill of giving scientific lectures D4- Acquisition of computer skills
	Teaching and Learning Methods
	Visual, oral, written and practical
	Assessment Methods
	Oral, written and practical exams, research and practical reports

11. Program Structure

Level/Year	Course or Module Code	Course or Module Title	Credit rating		
			Theoretical	practical	
1st/ 1st semester	103021112	Analytical Chemistry	3 hours	2 hours	Bachelor Degree Requires (x) credits
1st/ 2nd semester	1030211210	Organic Chemistry 1	3 hours	2 hours	
2nd/1st semester	103022211	Organic Chemistry 2	3 hours	2 hours	
2nd/2nd semester	103022211	Organic Chemistry 3	3 hours	2 hours	
3rd/ 1st semester	103013313	Inorganic Pharmaceutical Chemistry	3 hours	2 hours	
3rd/ 2nd semester	1030211210	Pharmaceutical Organic Chemistry 1	3 hours	2 hours	
4th/ 1st semester	103024412	Pharmaceutical Organic Chemistry 2	3 hours	2 hours	
4th/ 2nd	103024427	Pharmaceutical	3 hours	2 hours	

semester		Organic Chemistry 3		
5th/ 1st semester	103025512	Pharmaceutical Organic Chemistry 4	2 hours	-
5th/ 2nd semester	1030255210	Advanced Pharmaceutical Analysis	3 hours	2 hours

12. Awards and Credits
Personal development - increasing knowledge - scientific discussions - cultural events
13. Personal Development Planning
14. Admission criteria .
Academic GPA and physical health
15. Key sources of information about the programme
Scientific books, international research and discreet scientific articles -Fundamentals of Analytical Chemistry by Stook and West -Organic Chemistry by Robert T. Morrison and Robert N. Boyd - Organic Chemistry by McCurry; 5th ed. Thomason learning; CA,USA; 2000 -An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed -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); 12th ed, 2011. -Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill; 2. Applications of absorption spectroscopy of organic compounds by Dyer JR. -Organic Chemistry by McMurry; 5th ed; Thomason learning CA, USA 2000

Curriculum Skills Map

please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

				Programme Learning Outcomes															
Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
First	103021112	Analytical Chemistry	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
First	1030211210	Organic Chemistry 1	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Second	103022211	Organic Chemistry 2	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Second	103022211	Organic Chemistry 3	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Third	103013313	Inorganic Pharmaceutical Chemistry	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Third	1030211210	Pharmaceutical Organic Chemistry 1	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Fourth	103024412	Pharmaceutical Organic Chemistry 2	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Fourth	103024427	Pharmaceutical Organic Chemistry 3	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Fifth	103025512	Pharmaceutical Organic Chemistry 4	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Fifth	1030255210	Advanced Pharmaceutical Analysis	Basic	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Analytical Chemistry/103021112
4. Modes of Attendance offered	First Stage
5. Semester/Year	1st Semester/2022-2023
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Preparing students and supporting them with information related to qualitative and quantitative chemical analyzes and studying related theories.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with chemical compounds
A2- How to deal with scientific equipment
A3- Various scientific techniques
A4.
A5.
A6.

B. The skills goals special to the course.
B1- Acquisition of skill in how to deal with chemical compounds
B2- Acquiring the skill in writing scientific reports
B3.

Teaching and Learning Methods

1- Theoretical lectures
2- educational laboratories
3-Scientific Reports
4-desk research

Assessment methods

1- Mid-term and final exams
2- Oral exams and laboratory research
3-Use of scientific equipment

C. Affective and value goals
C1- Preparation of different chemical compounds and medicines
C2- Identify chemical compounds, drugs and their derivatives
C3- Performing chemical analyzes
C4.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams - scientific reports

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment 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-baseequilibria 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	Lectures	Oral and written exam

			introduction to optical methods of analysis; Methods based on absorption of radiation.		

11. Infrastructure	
1. Books Required reading:	Fundamentals of Analytical Chemistry by Stook and West.
2. Main references (sources)	Fundamentals of Analytical Chemistry by Stook and West.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development taking place.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Chemistry I /103021112
4. Modes of Attendance offered	First Stage
5. Semester/Year	2ed Semester/2022-2023
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
A study of classification, properties, preparation and reactions of alkanes, alkenes, alkynes, alcohols, ethers and benzene, and the study of stereochemistry.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with organic chemical compounds and their reactions.
A2- How to deal with scientific equipment
A3- Learning using different scientific techniques
A4- Knowledge of the methods used in the preparation of organic compounds.

B. The skills goals special to the course.
B1- Acquisition of skill in preparing compounds and medicines
B2- Acquisition of skill in the use of different methods in the manufacture and preparation of medicines
B3- Acquisition of skill in how to deal with chemical compounds
B4- Acquisition of skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams - scientific reports

C. Affective and value goals
C1- Preparation of different chemical compounds and medicines
C2- Identify chemical compounds, drugs and their derivatives
C3- Performing chemical analyzes
C4.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams - scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D 1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D 3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		An introduction	Lectures	Oral and written exam
3-2	6		Alkanes and methane	Lectures	Oral and written exam
5-4	6		Alkenes 1 and 2	Lectures	Oral and written exam
7-6	6		Alkynes and Dienes	Lectures	Oral and written exam
9-8	6		Stereochemistry 1	Lectures	Oral and written exam
10-12	8		Alcohols and Ethers	Lectures	Oral and written exam
14-13	7		Benzene	Lectures	Oral and written exam
15	3		Cyclic alkenes	Lectures	Oral and written exam

11. Infrastructure

1. Books Required reading:	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; 2015
2. Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; 2015
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan

By adding new topics that keep pace with scientific development

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Chemistry II /103021112
4. Modes of Attendance offered	second Stage
5. Semester/Year	1st Semester/2022-2023
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Organic chemistry 1 study of classification, properties, preparation and interactions of Halidate Alkille and vacuum chemistry II, lymphids, ketones, carboxic acids, their derivatives, insiders and phenols.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with organic chemical compounds and their interactions.
A2- How to deal with scientific devices.
A3- Learn to use different scientific techniques.
A4- Knowing the methods used to prepare organic compounds.
A5.
A6 .

B. The skills goals special to the course.
B1 - Equalization of skill in preparing vehicles and medicines
B2 - Gain skill in using different methods in manufacturing and preparing medicines
B3 - Gain skill in how to deal with chemical compounds
B4- Gain skill in writing scientific reports.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals
C1-Preparing chemical compounds and various medicines
C2-Learn about chemical compounds and medicines and their derivatives
C3-Chemical tests
C4-

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1-Conducting scientific experiments
D2-Equalization of skill in preparing medicines
D3- Granting confidence to the student by delivering scientific research
D4-Equalization of skill to detect and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment 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. Infrastructure

1. Books Required reading:	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; 2015
2. Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyd . Organic Chemistry by McCurry; 9th ed. Thomason learning; CA,USA; 2015
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan

By adding new topics to keep pace with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Chemistry III
4. Modes of Attendance offered	second Stage
5. Semester/Year	2ed Semester/2022-2023
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Organic Chemistry 3 Study of classification, properties, preparation and reactions of heterogeneous organic compounds	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with chemical compounds
A2- How to deal with scientific equipment
A3- Learning using different scientific techniques
A4- Knowing the methods used in preparing medicines
A5.
A6.

B. The skills goals special to the course.
B1- Acquisition of skill in preparing compounds and medicines
B2- Acquisition of skill in the use of different methods in the manufacture and preparation of medicines
B3- Acquisition of skill in how to deal with chemical compounds
B4- Acquiring the skill in writing scientific reports..

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals
C1- Preparation of different chemical compounds and medicines
C2- Identify chemical compounds, drugs and their derivatives
C3- Performing chemical analyzes
C4.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1-Conducting scientific experiments
D2-Equalization of skill in preparing medicines
D3- Granting confidence to the student by delivering scientific research
D4-Equalization of skill to detect and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	13		Heterocyclic system: Classes of heterocyclic systems; general structures; properties; Occurrence in nature 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

11. Infrastructure

1. Books Required reading:	Organic Chemistry by Robert T. Morrison and Robert N. Boyed, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomason learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.

2. Main references (sources)	Organic Chemistry by Robert T. Morrison and Robert N. Boyed, latest edition. Organic Chemistry by J. McMurry, latest ed., Thomason learning, CA, USA. An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development.

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Inorganic Pharmaceutical Chemistry
4. Modes of Attendance offered	3rd Year
5. Semester/Year	1st Semester
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Inorganic Pharmaceutical Chemistry The study of inorganic chemical compounds and their uses in medical diagnosis and treatment.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with chemical compounds
A2- How to deal with scientific equipment
A3- Learning using different scientific techniques
A4- Knowing the methods used in preparing medicines A5.
A6 .

B. The skills goals special to the course.
B1- Acquisition of skill in preparing compounds and medicines
B2- Acquisition of skill in the use of different methods in the manufacture and preparation of medicines
B3- Acquisition of skill in how to deal with chemical compounds
B4- Acquisition of skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals
C1-Preparation of inorganic chemical compounds and various medicines
C2-Identification of inorganic chemical compounds, medicines and their derivatives
C3- Performing chemical analyzes
C4.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	5		Atomic and molecular structure/ Complexation.	Lectures	Oral and written exam
3	2		Major intra and extra cellular electrolytes.	Lectures	Oral and written exam
4	2		Major physiological ions.	Lectures	Oral and written exam
5	2		Electrolytes used for replacement therapy.	Lectures	Oral and written exam
5	2		Electrolytes used in acid- base balance.	Lectures	Oral and written exam
6-7	7		Essential and trace ions: Iron, copper, sulfur, iodine.	Lectures	Oral and written exam
8-9	6		Non essential ions: Fluoride, bromide, lithium, gold, silver and mercury.	Lectures	Oral and written exam
10	2		Gastrointestinal agents.	Lectures	Oral and written exam
11	2		Acidifying agents.	Lectures	Oral and written exam
11	2		Antacids.	Lectures	Oral and written exam
12	2		Protective adsorbents.	Lectures	Oral and written exam
13	2		Radiopharmaceutical preparations.	Lectures	Oral and written exam
13-15	7		Radio opaque and contrast media.	Lectures	Oral and written exam

11. Infrastructure

1. Books Required reading:	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

2. 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
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	
12. The development of the curriculum plan	
By adding new topics to keep pace with the scientific development taking place	

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1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Inorganic Pharmaceutical Chemistry
4. Modes of Attendance offered	3rd Year
5. Semester/Year	2ed Semester
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Organic Pharmaceutical Chemistry 1 A study of the mechanism of action of the drug and the factors that affect it, in addition to the study of the metabolism of chemical compounds and drugs	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- How to deal with chemical compounds

A2- How to deal with scientific equipment

A3- Learning using different scientific techniques

A4- Knowing the factors that affect the stability, solubility and absorption of drugs

A5- Knowing the mechanism of action of the drug and the relationship of the chemical structure to that

A6- Knowledge of the methods used in the preparation of medicines

B. The skills goals special to the course.

B1- Acquisition of skill in preparing compounds and medicines

B2- Acquire skill in using different methods in manufacturing and preparing medicines

B3- acquiring the skill in how to deal with chemical compounds

B4- Gaining the skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals

C1- Knowing the methods of designing drugs and chemical compounds

C2- Knowledge of methods of laboratory synthesis of drugs and chemical compounds

C3- Learn the methods of laboratory analysis to know the composition of chemical compounds

C4- Preparing various medicines

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3- Giving confidence to the student by presenting scientific research
D4- Acquiring the skill to detect and classify drugs

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Drug distribution.	Lectures	Oral and written exam
2	3		Acid- base properties.	Lectures	Oral and written exam
3	3		Statistical prediction of pharmacological activity.	Lectures	Oral and written exam
4	2		QSAR models.	Lectures	Oral and written exam
5	1		Molecular modeling (Computer aided drug design).	Lectures	Oral and written exam
5	1		Drug receptor interaction: force involved.	Lectures	Oral and written exam
5	2		Steric features of drugs.	Lectures	Oral and written exam
6	1		Optical isomerism and biological activity.	Lectures	Oral and written exam
6	1		Calculated conformation.	Lectures	Oral and written exam
6	1		Three- dimensional quantitative structure activity relationships and databases.	Lectures	Oral and written exam
7	1		Isosterism.	Lectures	Oral and written exam
7	1		Drug-receptor interaction and subsequent events.	Lectures	Oral and written exam
8-14	22		General pathways of drug metabolism: Sites of drug biotransformation; Role of cytochrome P450 mono-oxygenases in oxidative biotransformation; Oxidative reactions; Reductive reactions; Hydrolytic reactions; Phase II reactions.	Lectures	Oral and written exam

15	2		Factors affecting drug metabolism.	Lectures	Oral and written exam

11. Infrastructure	
1. Books Required reading:	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
2. Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development taking place

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Pharmaceutical Chemistry II
4. Modes of Attendance offered	4th Year
5. Semester/Year	1st Semester
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Organic Pharmaceutical Chemistry 2 The study of drug discovery and development and the relationship between chemical composition and effectiveness	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- How to deal with chemical compounds

A2- How to deal with scientific equipment

A3- Learning using different scientific techniques

A4- Knowing the factors that affect the stability, solubility and absorption of drugs

A5- Knowing the mechanism of action of the drug and the relationship of the chemical structure to that

A6- Knowledge of the methods used in the preparation of medicines

B. The skills goals special to the course.

B1- Acquisition of skill in preparing compounds and medicines

B2- Acquire skill in using different methods in manufacturing and preparing medicines

B3- acquiring the skill in how to deal with chemical compounds

B4- Gaining the skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals

C1- Knowing the methods of designing drugs and chemical compounds

C2- Knowledge of methods of laboratory synthesis of drugs and chemical compounds

C3- Learn the methods of laboratory analysis to know the composition of chemical compounds

C4- Preparing various medicines

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Cholinergic agents, cholinergic receptors and their subtypes.	Lectures	Oral and written exam
2-3	5		Cholinergic agonists; stereochemistry and structure-activity relationships (SAR); products; cholinesterase inhibitors.	Lectures	Oral and written exam
4-5	7		Cholinergic blocking agent; structure-activity relationships (SAR); Solanaceous alkaloid and analogues; synthetic cholinergic blocking agents and products; ganglionic blocking agents (neuromuscular blocking agents).	Lectures	Oral and written exam
6	3		Analgesic agents (SAR of morphine, SAR of meperidine type molecules; SAR of methadone type compounds; N-methylbezomorphans, antagonist type analgesics in benzomorphans).	Lectures	Oral and written exam
7-8	7		Analgesic receptors, endogenous opioids; Products; Antitusive agents; Antiinflammatory analgesics.	Lectures	Oral and written exam
9-12	11		Adrenergic agents (Adrenergic	Lectures	Oral and written exam

			neurotransmitters); Adrenergic receptors; Drugs affecting Adrenergic neurotransmission; Sympathomimetic agents; Adrenergic receptor antagonists.		
13-15	9		CNS depressant; Benzodiazepines and related compounds; Barbiturates; CNS depressant with skeletal muscle relaxant properties; Antipsycotics; Anticonvulsants.	Lectures	Oral and written exam

11. Infrastructure	
1. Books Required reading:	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
2. Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development taking place

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Pharmaceutical Chemistry III
4. Modes of Attendance offered	4th Year
5. Semester/Year	2ed Semester
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Studying the discovery and development of drugs and the relationship between chemical composition and effectiveness	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
A1- How to deal with chemical compounds
A2- How to deal with scientific equipment
A3- Learning using different scientific techniques
A4- Knowing the factors that affect the stability, solubility and absorption of drugs
A5- Knowing the mechanism of action of the drug and the relationship of the chemical structure to that
A6- Knowledge of the methods used in the preparation of medicines

B. The skills goals special to the course.
B1 - Acquisition of skill in preparing compounds and medicines
B2 - Acquire skill in using different methods in manufacturing and preparing medicines
B3 - acquiring the skill in how to deal with chemical compounds
B4- Gaining the skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals
C1- Knowing the methods of designing drugs and chemical compounds
C2- Knowledge of methods of laboratory synthesis of drugs and chemical compounds
C3- Learn the methods of laboratory analysis to know the composition of chemical compounds
C4- Preparing various medicines

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	9		P-Lactam antibiotics (Penicillins); P-Lactamase inhibitors; Cephalosporins and Monobactams.	Lectures	Oral and written exam
4-6	9		Aminoglycosides and Chloramphenicol; Tetracylines; Macrolides; Lincomycins and Polypeptides; Antiviral agents (properties of viruses, viral classification, products).	Lectures	Oral and written exam
7	4		Sulfonamides (chemistry, nomenclature, mechanism of action, resistance, toxicity, side effects, metabolism, protein binding, distribution and SAR); products; Sulfones.	Lectures	Oral and written exam
8-13	17		Anti-neoplastic agents: Alkylating agents; Antimetabolites; Antibiotics; Plant products; Miscellaneous compounds.	Lectures	Oral and written exam
14-15	6		Hormones and related compounds; Future anti-neoplastic agents; Monoclonal antibodies; Gene therapy of cancer.	Lectures	Oral and written exam

11. Infrastructure	
1. Books Required reading:	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
2. Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development taking place

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Organic Pharmaceutical Chemistry IV
4. Modes of Attendance offered	5th Year
5. Semester/Year	1st Semester
6. Number of hours tuition (total)	30 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Organic Pharmaceutical Chemistry 4 Study drug introductions, their properties, preparation and medical uses, and study the use of computers in drug design	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- How to deal with chemical compounds

A2- How to deal with scientific equipment

A3- Learning using different scientific techniques

A4- Knowing the factors that affect the stability, solubility and absorption of drugs

A5- Knowing the mechanism of action of the drug and the relationship of the chemical structure to that

A6- Knowledge of the methods used in the preparation of medicines

B. The skills goals special to the course.

B1- Acquisition of skill in preparing compounds and medicines

B2- Acquiring the skill in using different methods in the manufacture and preparation of medicines

B3- Acquisition of skill in how to deal with chemical compounds

B4- Gaining the skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals

C1- Knowing the methods of designing drugs and chemical compounds

C2- Knowledge of methods of laboratory synthesis of drugs and chemical compounds

C3 - Learn the methods of laboratory analysis to know the composition of chemical compounds

C4- Preparing various medicines

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6		Basic concepts of prodrugs; Covalent bonds (cleavable); Prodrugs of functional groups; Types of prodrugs.	Lectures	Oral and written exam
4-6	6		Chemical delivery systems; Polymeric prodrugs; Types and structure of polymers; Cross-linking reagents.	Lectures	Oral and written exam
7-8	4		Drug targeting.	Lectures	Oral and written exam
8-9	4		Project.	Lectures	Oral and written exam
10-12	5		Combinatorial chemistry; Peptides and other linear structures; Drug like molecules; Support and linker; Solution-phase combinatorial chemistry.	Lectures	Oral and written exam
12-13	5		Detection, purification and analgesics; Encoding combinatorial libraries; High-throughput screening; Virtual screening; Chemical diversity and library design.	Lectures	Oral and written exam

11. Infrastructure

1. Books Required reading:	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
2. Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 12th ed, 2011
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
It is possible to replace some hours on the topic of Combinatorial Chemistry with the topic of Molecular Modeling due to the importance of the second topic in knowing how to design chemical compounds with pharmacological activities and predict their pharmacological efficacy using advanced electronic programs.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	Al-Nahrain University
2. University Department/Centre	College of pharmacy/Department of Pharmaceutical chemistry
3. Course title/code	Advanced Pharmaceutical Analyses
4. Modes of Attendance offered	5th Year
5. Semester/Year	2ed Semester
6. Number of hours tuition (total)	45 hours (theoretical and practical)
7. Date of production/revision of this specification	15/11/2022
8. Aims of the Course	
Advanced Pharmaceutical Analysis Study of spectral analysis methods and their use in identifying organic compounds	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- How to deal with chemical compounds

A2- How to deal with scientific equipment

A3- Learning using different scientific techniques

A4- Knowing the factors that affect the stability, solubility and absorption of drugs

A5- Knowing the mechanism of action of the drug and the relationship of the chemical structure to that

A6- Knowledge of the methods used in the preparation of medicines

B. The skills goals special to the course.

B1- Acquisition of skill in preparing compounds and medicines

B2- Acquisition of skill in using different methods for drug detection

B3- Acquisition of skill in how to deal with chemical compounds

B4- Gaining the skill in writing scientific reports

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

C. Affective and value goals

C1- Knowing the methods of designing drugs and chemical compounds

C2- Knowledge of methods of laboratory synthesis of drugs and chemical compounds

C3- Learn the methods of laboratory analysis to know the composition of chemical compounds

C4- Preparing various medicines

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams-scientific reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting scientific experiments
D2- Acquisition of skill in preparing medicines
D3-Giving confidence to the student by presenting scientific research
D4- Acquisition of the skill to identify and classify medicines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	10		UV / visible spectroscopy; Sample handling and instrumentation; Characteristic absorption of organic compounds; Rules for calculation of lambda max and application; Application of UV/visible; spectroscopy; Problems and solutions.	Lectures	Oral and written exam
4-8	14		Infra Red spectroscopy (theory and H-bonding effect; Sampling techniques and interpretation of spectra; Characteristic group frequencies of organic compounds; Application of IR spectroscopy; Problems and solutions.	Lectures	Oral and written exam
9-11	12		H_1 –Nucleomagnetic Resonance (NMR) and C_{13}-NMR spectroscopy; Introduction, the nature of NMR absorption, chemical shifts and factors affecting them, information obtained from NMR spectra, more complex spin-spin splitting patterns, application of H_1-NMR spectroscopy; C_{13}-NMR	Lectures	Oral and written exam

			spectroscopy: introduction and characteristics, DEPT C_{13}-NMR spectroscopy.		
12-14	9		Mass spectroscopy: Introduction and interpreting Mass spectra; interpreting Mass spectra fragmentation patterns, Mass behavior of some common functional groups.	Lectures	Oral and written exam
				Lectures	Oral and written exam
				Lectures	Oral and written exam
				Lectures	Oral and written exam
				Lectures	Oral and written exam

11. Infrastructure	
1. Books Required reading:	1. Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill; 2. Applications of absorption spectroscopy of organic compounds by Dyer JR. 3. Organic Chemistry by McMurry; 5thed; Thomason learning CA, USA 2000.
2. Main references (sources)	1. Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill; 2. Applications of absorption spectroscopy of organic compounds by Dyer JR. 3. Organic Chemistry by McMurry; 5thed; Thomason learning CA, USA 2000.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
By adding new topics to keep pace with the scientific development taking place