COURSE SPECIFICATION

The Organic Pharmaceutical Chemistry 4 course provides students with a deep understanding of the fundamentals and principles related to pharmaceuticals. The course includes studying the physical, chemical, and pharmaceutical properties of drugs, including dose factors and drug release. It also encompasses controlling the quality of drugs and techniques for their preparation, understanding the primary characteristics of prodrugs, their metabolism mechanisms, and elimination from the body, including chemical degradation and biological reactions. Additionally, the course explores the use of computational tools in drug design, including analyzing chemical data and predicting drug effects, with the aim of improving pharmaceutical design and analysis processes effectively.

1. Educational institution	Al-ayen Iraqi University - College of Pharmacy
2. College department/Center	Pharmaceutical chemistry
3. Course title/code	Organic pharmaceutical chemistry IV **PH5101**
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	First semester 2023-2024
6. Credits (total)	45 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

Objectives of the Organic Pharmaceutical Chemistry 4 course include:

1- Study drug introductions and understand their physical, chemical and pharmaceutical properties, including factors that affect dose selection and drug release.

2- Learn techniques for preparing drugs and controlling their quality, including the pharmaceutical composition of the drug and the factors that affect its transport and absorption in the body.

3- Studying the primary properties of the drug and how it is metabolized and excreted from the body, including the chemical decomposition processes and biological

reactions that the drug undergoes inside the body.

4- Exploring the uses of automated computing in drug design, including the use of pharmaceutical software to analyze chemical data, predict drug effects, and improve drug design and analysis processes.

9. Learning Outcomes, Teaching, Learning and Assessment Method

A-Cognitive goals

A-1- Statement of knowledge and basic principles in chemistry
A-2 Conducting practical experiments on theoretical concepts
A-3 Preparing illustrative means
A- 4 Preparing brief reports

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

-Providing the student with the basics and topics related to knowledge
-Clarification and explanation of study materials by the teaching staff
-Asking students to visit the library to obtain academic knowledge
-Request reports and seminars on the topics covered

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. Theory Course Structure					
Week	**Hrs.**	**ILOs**	**Unit/Module or Topic Title**	**Teaching methods**	**Assessment methods**
1-3	6	1A,2A, ,1B,2B,3B, ,2C,3C,4C,1D,2D,3D,4D	Basic concept of prodrugs; Covalent bonds (cleavable); Prodrugs of functional groups; Types of prodrugs.	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Final exam
4-6	6	1A,2A,3A,4A,1B,2B, ,4B,1C,2C,3C,4C,1D, 4D	Chemical delivery systems; Polymeric prodrugs; Types and structure of polymers; Cross-linking reagents.		
7-8.	4	1A, ,4A,1B,2B, 4B,1C,2C,3C,4C,1D, ,3D,4D	Drug targeting.		
9	2	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	Project.		
10-12	6	1A, 3A,4A,1B,2B,3B,4B,1C ,4C,1D,2D,3D,4D	Combinatorial chemistry; Peptides and other linear structures; Drug like molecules; Support and linker; Solution-phase combinatorial chemistry		
13-15	6	1A,2A,3A,4A, ,3B,4B,1C,2C, ,1D,2D,3D,4D	High-throughput screening; Virtual screening; Chemical diversity and library design		

11. Infrastructure	
Books Required reading	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 10th ed,
Main references (sources)	Wilson and Gisvold Textbook of Organic medicinal and Pharmaceutical chemistry, Delgado JN, Remers WA, (Eds); 10th ed,
Recommended books and references (scientific journals, reports…).	**Scientific journals in basic specializations**
Electronic references, Internet sites…	**Websites of Arab and foreign universities and pharmaceutical companies**

12. Course development plan
Developing curricula to suit the development in the chemical structures of medicines and changing the active groups to obtain chemical compounds with advanced therapeutic effectiveness and study their chemical properties.

COURSE SPECIFICATION

The Advanced Pharmaceutical Analysis course offers students an in-depth and advanced study in the concepts and techniques related to the analysis of drugs and pharmaceutical compounds. The course covers advanced chemical analysis techniques such as visible and invisible spectroscopy, chromatography-mass spectrometry (LC-MS), nuclear magnetic resonance (NMR), and CHN analysis and IR in addition to other spectroscopic methods. The course focuses on applying these techniques to the analysis of various types of pharmaceutical compounds, including solid, liquid, and biological drugs. The course also includes studying the basic principles of compound analysis and pharmaceutical quality, as well as the use of software for pharmaceutical analysis and interpretation of data resulting from the analyses. The course aims to provide students with the practical and theoretical skills necessary to analyze drugs and evaluate their quality in an accurate and effective manner.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Pharmaceutical chemistry
3. Course title/code	Advance pharmaceutical chemistry **PH5204**
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	45 hrs+ 30 hrs practical
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1- Identify the different types of spectrum:

This includes learning about common spectra such as ultraviolet and visible (UV-Vis), infrared (IR), nuclear magnetic resonance (NMR), and mass spectrometry. This aims to understand the spectral ranges and what information can be extracted from each species.

2- Uses of spectrum in identifying organic compounds:

Students learn how to use different spectra to determine the identities of organic compounds. For example, UV-Vis spectroscopy can be used to determine absorbed colors that may correlate with the composition of a compound. While the NMR spectrum gives information about the relative distribution of atoms in the compound.

3- Training on practical methods for various spectrum measurements:

Students are trained in the use of various devices and techniques used in spectrometer measurements. This includes interacting with the device and adjusting conditions to obtain accurate data and correct readings.

These points contribute to developing a deep understanding of the principles of spectroscopy and how to analyze the resulting data to identify and define organic compounds.

9. Learning Outcomes, Teaching, Learning and Assessment Method

A-Cognitive goals

1A - The use of the ultraviolet spectrum in diagnosing organic and pharmaceutical compounds, including detecting double bonds, determining the arrangement and type of bonds, and the presence of active groups, chromophores, and oxochromes in molecules.

2A- The use of infrared spectrum in the diagnosis of organic and medicinal compounds, specifying the type of active and substituting groups and the effect of influencing factors. This includes knowledge of active group adsorption zones and their applications in organic chemistry.

3A- Using nuclear magnetic resonance spectroscopy to diagnose organic and pharmaceutical compounds, by studying protons and 13C products to accurately determine the chemical structure.

4A - The use of mass spectrometry in the diagnosis of organic and pharmaceutical compounds, as it determines the molecular weight and contributes to the identification of isotopes and active groups.

B-The skills goals special to the course

1B - Knowing the formulas of some unknown organic compounds through analyzing their spectra, which contributes to developing the skills of interpreting spectral data and determining the molecular structure.

2B - Acquiring the skill in identifying active groups in chemical and pharmaceutical compounds, by examining and analyzing spectra to determine chemical and molecular bonds.

3B - Acquire the skill to deduce the conditions affecting the substituted groups, whether they attract or repel electrons, and understand their effect on the chemical properties of the compound.

4B - Acquire the skill in linking the results extracted from the application of various spectroscopic techniques, analyzing data to understand chemical reactions, and writing practical reports that explain the results accurately and systematically.

Teaching and Learning Methods

Seminars - daily assignments - written exams

Assessment methods

Oral and written exams - scientific reports

C-Affective and value goals

C1- Asking questions about topics that can be discussed by students -
C2: Asking questions that the student solves for the classroom -
C 3 Conduct quick intellectual exams
C 4- Identifying drug analyses

Teaching and Learning Methods

Providing the student with the basics and topics related to knowledge
Clarification and explanation of study materials by the teaching staff
Asking students to visit the library to obtain academic knowledge
Request reports and seminars on the topics covered

Assessment methods

Seminars - daily assignments - written exams

D-General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D- 1 - Follow up on external sources
D-2 Preparing external questions from these sources -
D-3 Urging students to follow educational sequences
D-4 How to identify the chemical compounds of drugs through pharmaceutical analyses

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	3	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	UV / visible spectroscopy; Sample handling and Characteristic instrumentation; absorption of organic compounds;	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Final exam
2.	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Rules for calculation of lambda max and application; Application of UV/visible; spectroscopy;		
3.	3	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	Infra Red spectroscopy)theory bonding effect		
4.	3	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	Sampling techniques and interpretation of spectra; Characteristic group frequencies of organic compounds.		
5	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Application of IR spectroscopy; Problems and solutions.		
6-8	9	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Introduction, the nature of NMR absorption, chemical shifts and factors affecting them.		
9-11	9	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Information obtained from NMR spin -spectra, more complex spin splitting patterns, application of 1HNMR Spectroscopy		
12	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	C13_NMR Spectroscopy, introduction and characteristics DEPTC13-NMR Spectroscopy		
13	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Introduction and interpreting Mass spectra		
14	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Interpreting Mass spectra fragmentation patterns,		

			Mass behavior of some common functional groups.	
15	3	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Applications of mass spectroscopy for pharmaceutical analysis. CHN	

10. Laboratory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1	2	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	Introduction &demonstration to visible spectrophotometry.	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Final exam
2	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Absorption spectra of known colored solution. .		
3	2	1A,2A,3A,4A,1B,2B,3B,4B, 1C,2C,3C,4C,1D,2D,3D,4D	Absorption spectra of unknown colored solution.		
4.	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Beer's law plot of known solution.		
5.	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Beer's law plot of unknown solution.		
6.			Mid Examination		
7.	2	1A,2A,3A,4A,1B,2B,3B,4B ,1C,2C,3C,4C,1D,2D,3D,4 D	Colorimetric assay of tetracycline (FeCl3), known sample. Colorimetric assay of tetracycline (FeCl3), unknown sample		
8.	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of tetracycline (acid), known sample.		
9.	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of tetracycline (acid), unknown sample.		
10	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of streptomycin (maltol, known sample).		
11	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of streptomycin (maltol, unknown sample).		

12	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of streptomycin (oxidized, known sample).		
13	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of streptomycin (oxidized, unknown sample). Colorimetric assay of tetracycline (basic, known sample).		
14.	2	1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Colorimetric assay of tetracycline (basic unknown sample).		
15.		1A,2A,3A,4A,1B,2B,3B,4B,1C,2C,3C,4C,1D,2D,3D,4D	Final Exam		

11. Infrastructure	
Books Required reading	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill ,2005. Organic Chemistry by McMurry; 7thed;Thomason learning CA, USA 2008..
Main references (sources)	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill ,2005 Modern Pharmaceutical Drug Analysis, by L Zechmeister And L. Von Cholnoky, ISBN (13) : 978-81-224-2718-9 2. Pharmaceutical Analysis Edited by DAVID C. LEE GlaxoSmithKline Stevenage, UK and MICHAEL L. WEBB Gl
Recommended books and references (scientific journals, reports…).	Scientific journals in basic specializations
Electronic references, Internet sites…	WEBSITE of universities

12. Course development plan
Developing curricula to suit the development in the chemical structures of drugs and changing the active groups to obtain chemical compounds with advanced therapeutic efficacy and studying their chemical properties, integrating modern topics and practical applications. Encouraging discussions and research projects. Provide additional learning resources and create online resources to provide information. Workshops and training courses.

COURSE SPECIFICATION

This course description provides a necessary summary of the most important characteristics of the course and the learning results expected from the student to achieve, demonstrating whether he has achieved the maximum benefit from the available learning opportunities. It must be linked to the program description.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Clinical Chemistry-PH5104
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	First Semester / Fifth Year
6. Credits (total)	45 h Theory + 30 h Lab
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. Helping to understand the principles of clinical chemistry.
2. Providing a solid foundation for a successful chemical career
3. Providing the student with some basic skills that may be necessary for future studies, such as analyzing results and documents and using the Internet.
4. Enabling the student to prepare seminars on advanced clinical chemistry topics.

9. Learning Outcomes, Teaching, Learning and Assessment Method

I. Cognitive goals

1. Presenting the concepts of selected topics in clinical chemistry research.
2. Theoretical application to practical experiments and measurement rules in clinical chemistry.
3. Statement of basic knowledge and principles in clinical chemistry

J. The skills goals special to the course

1. Preparing students' research projects.
2. Operational reports.
3. Holding conferences and workshops and participating in scientific discussions.

Teaching and Learning Methods

1- Multimedia lectures
2- Group discussion
3- Workshops and seminars
4- Laboratory training
5- Small group tasks
6- Power Point presentation

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

K. Affective and value goals

1. Raising students on professional humanitarian work.
2. Promoting and consolidating professional and ethical values among students practicing the profession of pharmacist.
3. Enhancing the spirit of cooperation and teamwork among students.
4. Training students to respect the freedom of thought, expression, and creativity of others.
5. Developing students' sense of responsibility during the study period and during work.

Teaching and Learning Methods

1- Discussing group work.
2- Writing self-reports.
3- Using a strategy of cooperation and assistance during the education process.
4- Field visits to relevant ministries and educational institutions.

Assessment methods

1. Surprising, inferential questions during discussion of various aspects of education.
2. Homework.
3. Electronic exams on the electronic platform.

L. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1. Communicating ideas regarding clinical chemistry.
2. Displaying lectures with drawings and pictures.
3. Using external sources

10. Course Structure: Theory

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Liver Function	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Calcium Metabolism		
3.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Kidney + Calcium		
4.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Endocrinology		
5.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Hypothalamus		
6.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Adrenal Gland		
7.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Reproductive System		
8.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Pregnancy		
9.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Hyperlipidemia		
10.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Hyperlipidemia		
11	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Tumor Marker		
12	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Carbohydrates		
13		A1, A2,, A4, B1, B2, B3, B5, C1, C2,C5, D1, D2, D4, D5	Acid-base Balance		
14		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical Enzymology		
15		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Revision		

Course Structure: Lab					
Week	**Hrs.**	**ILOs**	**Unit/Module or Topic Title**	**Teaching methods**	**Assessment methods**
1.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of blood glucose	Use of materials and devices in laboratories	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of CK activity		
3.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum bilirubin + phosphate		
4.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of blood urea		
5.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum creatinine		
6.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of uric acid level in the blood		
7.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum cholesterol		
8.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum HDL-cholesterol		
9.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum triglycerides		
10.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of serum LDL-cholesterol		
11	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Estimation of AST and ALT enzymes		
12	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Immunodeficiency disorders		
13		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Ankylosing spodylitis; Gout; Osteoarthritis syndrome.		
14		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Alteration in immune response: Hypersensitivity disorders.		
15		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Revision		

11. Infrastructure	
Books Required reading	Clinical chemistry crook last edition
Main references (sources)	
Recommended books and references (scientific journals, reports…).	Clinical chemistry marshal last edition
Electronic references, Internet sites…	.

12. Course development plan
Adding some materials, such as the effect of medications on the measurement of some laboratory tests.

COURSE SPECIFICATION

This course description provides a necessary summary of the most important characteristics of the course and the learning results expected from the student to achieve, demonstrating whether he has achieved the maximum benefit from the available learning opportunities. It must be linked to the program description.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Clinical laboratory Training-PH5105
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	First semester /Fifth Year
6. Credits (total)	48 h
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. Help in understanding chemical and biological analyses.
2. Providing a solid foundation for a successful chemical career
3. Providing the student with some basic skills that may be necessary for future studies, such as analyzing results and documents and using the Internet.
4. Enabling the student to prepare seminars related to training materials

9. Learning Outcomes, Teaching, Learning and Assessment Method

M. Cognitive goals

1. Practical application to laboratory experiments
2. Statement of basic knowledge and principles in hospital training material.

N. The skills goals special to the course

1. Preparing students' research projects
2. Operational reports
3. Holding conferences and workshops and participating in scientific discussions

Teaching and Learning Methods

1- Discussing group work in the laboratory.
2- Workshops and seminars.
3- Training in clinical laboratories.
4- Small group tasks.
5- PowerPoint presentation

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

O. Affective and value goals

1. Raising students on professional humanitarian work.
2. Promoting and consolidating professional and ethical values among students practicing the profession of pharmacist.
3. Enhancing the spirit of cooperation and teamwork among students.
4. Training students to respect the freedom of thought, expression, and creativity of others.
5. Developing students' sense of responsibility during the study period and during work.

Teaching and Learning Methods

1- Discussing group work.
2- Writing self-reports.
3- Using a strategy of cooperation and assistance during the education process.
4- Field visits to relevant ministries and educational institutions.

Assessment methods

1. Surprising, inferential questions during discussion of various aspects of education.
2. Homework.
3. Electronic exams on the electronic platform.

P. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1. Communicating ideas regarding hospital training material.
2. Display lectures with drawings and pictures.
3. Use external sources.

10. Course Structure: Lab

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Basics of diagnostic testing, sample collection and transport, venipuncture, urine samples, stool samples	Use of materials and devices in laboratories	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Basics of diagnostic testing, sample collection and transportation, venipuncture, urine samples, stool samples		
3.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Biochemical tests: fasting blood glucose, postprandial glucose		
4.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Oral glucose tolerance test		
5.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Blood urea, blood creatinine		
6.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Creatinine clearance, uric acid		
7.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Cholesterol and lipoproteins		
8.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Triglyceride.		
9.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Blood proteins		
10.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Bilirubin		
11	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Calcium and inorganic phosphate		
12	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Serum chloride		
13		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Alkaline phosphatase, acid phosphatase, alanine aminotransferase		

14		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Aspartate aminotransferase, lactate dehydrogenase, creatine phosphokinase		
15		A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Serological tests: VDRL		

11. Infrastructure	
Books Required reading	Fischbach ; manual & laboratory &diagnostic tests 10 th edition 2020
Main references (sources)	
Recommended books and references (scientific journals, reports…).	Lehninger (principles of biochemistry) 7 edition 2017
Electronic references, Internet sites…	

12. Course development plan
1. Developing students' skills by training them on laboratory equipment in central health laboratories. 2. Maintaining scientific sobriety through the use of valuable sources and international books.

COURSE SPECIFICATION

Applied Therapeutics I is a foundational course designed to introduce pharmacy students to the fundamental principles of pharmacotherapy and their application in patient care. Throughout the course, students will explore the rational use of medications for the management of common acute and chronic diseases across various patient populations. Emphasis will be placed on medication selection, dosing considerations, therapeutic monitoring, and patient counselling.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Applied therapeutics I/PH5103
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	First semester 2023-2024
6. Credits (total)	3 hr x 15 weeks = 45 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. After completing the course, the student must acquire sufficient knowledge of the concepts of the main skills of pharmaceutical care services, basic skills in practicing pharmacy for various purposes and developing treatment plans for chronic diseases
2. Providing students with the knowledge and skills necessary to make evidence-based treatment decisions in real clinical situations
3. Promote a deep understanding of drug interactions, doses, and monitoring parameters to achieve the best therapeutic results.
4. Instill the importance of individualizing treatment plans according to the needs of each individual patient, taking into account factors such as age, chronic diseases, and lifestyle.
5. Develop the ability to critically evaluate clinical data, identify medication-related problems, and suggest appropriate interventions.
6. To learn about recent research and guidelines related to diseases to ensure that students are always aware of the latest developments in this field.

9. Learning Outcomes, Teaching, Learning and Assessment Method

E. Cognitive goals

1. Identify the basic principles of pharmaceutical care for disorders of the cardiovascular system (arrhythmia, thrombosis, stroke, shock, acute coronary syndrome, and dyslipidemia).
2. Identify the basic principles of pharmaceutical care for liver disease disorders (hepatitis and cirrhosis), inflammatory bowel disease, liver disorders, epilepsy, Parkinson's disease, headache, and pain management.
3. Describe the different classes of medications used to treat heart disease, gastrointestinal disorders, and liver and kidney diseases.
4. Describe the mechanism of action, therapeutic uses, and doses of these different classes.
5. Critically evaluate clinical data, taking into account factors such as patient history, disease state, and treatment options to optimize drug therapy and patient outcomes.
6. Utilize current evidence-based guidelines to guide treatment decision-making and adapt to evolving medical practices.
7. To be able to communicate with the patient and the medical staff during the treatment stages.
8. To be able to educate the patient regarding the medications given to them.

F. The skills goals special to the course

1. Conduct comprehensive patient evaluations to make appropriate treatment decisions.
2. Demonstrates proficiency in administering medication regimens, including dosage adjustments, monitoring, and patient education.
3. Guiding patients on the safe and effective use of medications.
4. Develop and implement a therapeutic evaluation plan for patient follow-up.

Teaching and Learning Methods

1- PowerPoint and Multimedia presentation
2- Class discussion
3- Presentation of cases
4- Handouts
5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

G. Affective and value goals

1. Promoting awareness of the importance of empathy and understanding in providing pharmaceutical care and dealing with humanitarian patients.
2. Increase pharmaceutical ethical values such as honesty, integrity, respect, and fairness in the pharmacist's interactions with patients and other medical teams.

3. Encouraging evidence-based values and critical thinking in pharmaceutical decision-making to follow up-to-date scientific research.
4. Enhancing awareness of the importance of the various social responsibilities of the pharmacist in providing high-quality health care.
5. Promoting awareness of the importance of maintaining patients' privacy and confidentiality of their health information and their legal obligations related to this aspect.
6. Encouraging the development of effective communication capabilities and cooperation within diverse medical specialties.
7. Promoting awareness of the importance of achieving a balance between the work of the pharmacist to obtain personal light on the emotional and psychological.

Teaching and Learning Methods

1- Case studies
2- Discussions
3- Lectures
4- Assignments
5- PowerPoint.
7- Hospital training.

Assessment methods

5. Case-based scenarios
6. Theoretical and practical exams

H. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1- Determine the appropriate medication for a single or multiple medical condition.
2- Determine the appropriate medications used to manage individual or multiple clinical conditions (treating the patient as a whole and not as a single disease).
3- Demonstrate the ability to communicate verbally and in writing
4- Choosing the appropriate medication for the studied diseases according to their causes and pathophysiology.
5- Engage effectively in a range of independent roles and discuss in an important way. Produce coherent reports in accordance with professional standards; Deliver high-quality oral presentations and other presentations.
6- Solve problems and design treatment plans and timetables to achieve goals on time.

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Acute coronary atherosclerosis syndrome	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	arrhythmia		
3.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Blood clotting and stroke		
4.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Hypercholesterolemia		
5.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Shock		
6.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	CNS diseases		
7.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Cirrhosis and viral hepatitis		
8.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Increased intraocular pressure - nerve fibrosis		
9.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Acute kidney failure		
10.	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Chronic kidney deficiency and dialysis		
11	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	TPN		
12	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Urinary incontinence and Nocturnal urination		
13	3	A1, A2, A3, B1, B2, B3, C1, D1	Interpretation of laboratory results		
14	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Fluids, minerals, and acid-base disturbances		
15	3	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Colitis-systemic lupus erythematosus		

11. Infrastructure	
Books Required reading	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 12th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition. Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics
Main references (sources)	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 12th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition 3. Pharmacotherapy casebook: a patient focused approach,Mcgraw Hill) 4- Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics 6th edition.
Recommended books and references (scientific journals, reports…).	Journal of Clinical pharmacy and therapeutics International journal of clinical pharmacy
Electronic references, Internet sites…	UpToDate Internet

12. Course development plan
Using the round table system in the laboratory. Increase access to paid programs, Lexicomp, up-to-date, Micromedex. Introducing OSCE.

COURSE SPECIFICATION

Applied Therapeutics II is an advanced course designed to further develop pharmacy students' knowledge and skills in the application of pharmacotherapeutic principles to patient care. Building upon the foundational concepts covered in Applied Therapeutics I, this course focuses on the management of complex medical conditions and the optimization of drug therapy in diverse patient populations. Through a combination of didactic lectures, case-based discussions, and clinical simulations, students will deepen their understanding of pharmacotherapy principles and enhance their clinical reasoning abilities.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Applied therapeutic II/PH5202
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	2 hr x 15 weeks = 30 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. After completing the course, the student must acquire sufficient knowledge of the concepts of the main skills of pharmaceutical care services, basic skills in practicing pharmacy for various purposes and developing treatment plans for chronic diseases
2. Providing students with the knowledge and skills necessary to make evidence-based treatment decisions in real clinical situations
3. Promote a deep understanding of drug interactions, doses, and monitoring parameters to achieve the best therapeutic results.
4. Instill the importance of individualizing treatment plans according to the needs of each individual patient, taking into account factors such as age, chronic diseases, and lifestyle.
5. Develop the ability to critically evaluate clinical data, identify medication-related problems, and suggest appropriate interventions.

6. To learn about recent research and guidelines related to diseases to ensure that students are always aware of the latest developments in this field.

9. Learning Outcomes, Teaching, Learning and Assessment Method

A. Cognitive goals

1. Identify the basic principles of pharmaceutical care for the diseases taken in the course.
2. Describe the different classes of medications used to treat the diseases taught in this course.
3. Describe the mechanism of action, therapeutic uses, and doses of these different classes.
4. Critically evaluate clinical data, taking into account factors such as patient history, disease state, and treatment options to optimize drug therapy and patient outcomes.
5. Utilize current evidence-based guidelines to guide treatment decision-making and adapt to evolving medical practices.
6. To be able to communicate with the patient and the medical staff during the treatment stages.
7. To be able to educate the patient regarding the medications given to them.

B. The skills goals special to the course

1. Conduct comprehensive patient evaluations to make appropriate treatment decisions.
2. Demonstrates proficiency in administering medication regimens, including dosage adjustments, monitoring, and patient education.
3. Guiding patients on the safe and effective use of medications.
4. Develop and implement a therapeutic evaluation plan for patient follow-up.

Teaching and Learning Methods

1- PowerPoint and Multimedia presentation
2- Class discussion
3- Presentation of cases
4- Handouts
5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

C. Affective and value goals

1. Promoting awareness of the importance of empathy and understanding in providing pharmaceutical care and dealing with humanitarian patients.
2. Increase pharmaceutical ethical values such as honesty, integrity, respect, and fairness in the pharmacist's interactions with patients and other medical teams.
3. Encouraging evidence-based values and critical thinking in pharmaceutical decision-

making to follow up-to-date scientific research.
4. Enhancing awareness of the importance of the various social responsibilities of the pharmacist in providing high-quality health care.
5. Promoting awareness of the importance of maintaining patients' privacy and confidentiality of their health information and their legal obligations related to this aspect.
6. Encouraging the development of effective communication capabilities and cooperation within the diverse medical specialties.
7. Promoting awareness of the importance of achieving a balance between the work of the pharmacist to obtain personal light on the emotional and psychological.

Teaching and Learning Methods

1- Case studies
2- Discussions
3- Lectures
4- Assignments
5- PowerPoint.
7- Hospital training.

Assessment methods

1. Case-based scenarios
2. Theoretical and practical exams

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1- Determine the appropriate medication for a single or multiple medical condition.
2- Determine the appropriate medications used to manage individual or multiple clinical conditions (treating the patient as a whole and not as a single disease).
3- Demonstrate the ability to communicate verbally and in writing
4- Choosing the appropriate medication for the studied diseases according to their causes and pathophysiology.
5- Engage effectively in a range of independent roles and discuss in an important way. Produce coherent reports in accordance with professional standards; Deliver high-quality oral presentations and other presentations.
6- Solve problems and design treatment plans and timetables to achieve goals on time.

10. Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Thyroid disease	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Gynecology and contraception		
3.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Menstrual disorders and hormone replacement therapy		
4.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Introduction to cancer diseases		
5.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Leukemia		
6.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Lymphoma		
7.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Breast cancer		
8.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Prostate Cancer		
9.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Colon cancer		
10.	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Adrenal disease		
11	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Depression disease and schizophrenia		
12	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Fatigue and insomnia		
13	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Bipolar schizophrenia		
14	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Alzheimer's		
15	2	A, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, D1, D2, D3, D4, D5, D6	Revision		

11. Infrastructure	
Books Required reading	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 11th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition. Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics
Main references (sources)	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 11th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition 3. Pharmacotherapy casebook: a patient focused approach,Mcgraw Hill) 4- Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics 6th edition.
Recommended books and references (scientific journals, reports…).	Journal of Clinical pharmacy and therapeutics International journal of clinical pharmacy
Electronic references, Internet sites…	UpToDate Internet

12. Course development plan
Using the round table system in the laboratory. Increase access to paid programs, Lexicomp, up-to-date, Micromedex. Introducing OSCE.

COURSE SPECIFICATION

The Therapeutic Drug Monitoring (TDM) course is designed to equip pharmacy students with the essential knowledge and skills required to effectively implement and interpret therapeutic drug monitoring practices. This course focuses on the principles and applications of TDM in optimizing medication therapy and improving patient outcomes. Throughout the course, students will explore the role of TDM in individualizing drug therapy, managing drug toxicity, and ensuring therapeutic efficacy across different patient populations and disease states. Emphasis will be placed on understanding the pharmacokinetic and pharmacodynamic principles underlying TDM, as well as the factors influencing drug concentration monitoring and dose adjustment.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	TDM/ PH5203
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	2 hr x 15 weeks = 30 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. The current course enables students to learn how to select the most appropriate medications for individuals, recommend dosage regimens likely to achieve the desired therapeutic response with minimal risk of adverse effects and monitor drug effects if appropriate.
2. Students will apply clinical pharmacokinetic principles, which are essential for current clinical pharmacy practice and may become even more important with the expansion of pharmacists' roles in medication prescribing.

9. Learning Outcomes, Teaching, Learning and Assessment Method

E. Cognitive goals

1. Identify the main concepts in pharmacokinetics such as absorption, distribution, metabolism, and excretion.
2. Understand how different factors such as age, gender, and health status affect pharmacokinetics.
3. Analyze pharmacokinetics data and use it to determine optimal doses of medications and adjust treatment.
4. Apply knowledge of pharmacokinetics to understand and interpret patients' drug response and improve therapeutic outcomes.

F. The skills goals special to the course

1. Students' ability to estimate the optimal doses of medications using available information such as weight, age, and health condition.
2. The ability to analyze pharmacokinetic data and use it to estimate drug kinetic parameters such as half-life and area under curvature.
3. Estimating the pharmacological effect of medications according to available pharmacological information and using this information in clinical decision-making.
4. Analyzing drug information and providing drug recommendations based on scientific evidence to improve the quality of health care.
5. The ability to communicate effectively with other health team members to exchange drug information and improve coordination between teams.

Teaching and Learning Methods

1- PowerPoint and Multimedia presentation
2- Class discussion
3- Presentation of cases
4- Handouts
5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

G. Affective and value goals

1- Adhere to the highest standards of ethical and professional behavior in all aspects of treatment decision-making and patient care.
2- Demonstrating commitment to patient safety.
3- Evidence-based practice.
4- Respect the patient's autonomy and preferences.
5- Collaborate effectively with other healthcare professionals for the best interest of the patient.

Teaching and Learning Methods
1- Case studies 2- Discussions 3- Lectures 4- Assignments 5- PowerPoint presentation
Assessment methods
3. Case-based scenarios 4. Theoretical and practical exams
H. General and rehabilitative transferred skills (other skills relevant to employability and personal development)
1. Determine the appropriate medication at the appropriate dose for an individual or multiple disease condition. 2. Solve problems and design treatment plans and schedules to achieve goals on time. 3. To be able to work in the hospital's pharmacy and specialized departments.

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Review of basic pharmacokinetic (PK) and pharmacodynamic (PD)	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK equations and calculations		
3.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK in special population and cases		
4.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Aminoglycosides		
5.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Vancomycin		
6.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Digoxin		
7.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Phenytoin		
8.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for other Anticonvulsants (e.g., Carbamazepine, Valproic Acid, Phenobarbitone/Primidone, Ethosuximide		
9.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Theophylline		
10.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Immunosuppressants (e.g., Cyclosporine, Tacrolimus		
11	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for other Cardiovascular agents (e.g., Lidocaine, Procainamide/N-Acetyl Procainamide		
12	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD of other drugs (e.g., Lithium), Anticancer agents, and Anticoagulants		

10. Laboratory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Review of basic pharmacokinetic (PK) and pharmacodynamic (PD)	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Cases	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK equations and calculations		
3.	2	A1, A2, A3, B1, B2, B3, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK in special population and cases		
4.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Aminoglycosides		
5.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Vancomycin		
6.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Digoxin		
7.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Phenytoin		
8.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for other Anticonvulsants (e.g., Carbamazepine, Valproic Acid, Phenobarbitone/Primidone, Ethosuximide		
9.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Theophylline		
10.	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for Immunosuppressants (e.g., Cyclosporine, Tacrolimus		
11	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD for other Cardiovascular agents (e.g., Lidocaine, Procainamide/N-Acetyl Procainamide		
12	2	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C4, C5, D1, D2, D4, D5	Clinical PK/PD of other drugs (e.g., Lithium), Anticancer agents, and Anticoagulants		

11. Infrastructure	
Books Required reading	Applied Clinical Pharmacokinetics, latest Edition, by Larry A. Bauer. Additional references include but not limited to the following: Clinical Pharmacokinetics Concepts and Applications, latest Edition, by Malcolm Rowland and Thomas Tozer.
Main references (sources)	Applied Clinical Pharmacokinetics, latest Edition, by Larry A. Bauer. Additional references include but not limited to the following: Clinical Pharmacokinetics Concepts and Applications, latest Edition, by Malcolm Rowland
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	

12. Course development plan
Not available

COURSE SPECIFICATION

The present course will give students a basic understanding of the tools needed to assess the costs and outcomes of medications and pharmaceutical care services. It will enable participants to evaluate the pharmacoeconomic and quality of life literature for the purpose of rational decision-making. Students will be exposed to the drug-focused approaches to pharmacoeconomic research and the fundamentals of quality-of-life research.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Pharmacoeconomics/ PH5201
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	2 hr x 15 weeks = 30 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. The course gives students a basic understanding of the tools needed for pharmacoeconomics.

2. Evaluates the costs and outcomes of medications and pharmaceutical care services.

3. It will enable participants to evaluate the pharmacoeconomics and quality of life literature for the purpose of making rational decisions.

4. Students will be exposed to drug-focused approaches in pharmacoeconomic research and the fundamentals of quality of life research.

9. Learning Outcomes, Teaching, Learning and Assessment Method

A. Cognitive goals

1. Understand the various methods used to evaluate the costs and benefits of drugs, including cost-effectiveness analysis and cost-benefit analysis.
2. The ability to estimate the costs associated with different treatments and analyze them in comparison with the desired outcomes to provide economic recommendations.
3. Study the foundations of pharmacoeconomics.

B. The skills goals special to the course

1. Applying various economic tools such as cost-benefit analysis and cost-effectiveness evaluation in evaluating medicines and their policies.
2. Apply economic concepts in making decisions related to the provision and use of medicines and determining health policies.

Teaching and Learning Methods

1- PowerPoint and Multimedia presentation
2- Class discussion
3- Presentation of cases
4- Handouts
5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

C. Affective and value goals

1- Adhere to the highest standards of ethical and professional behavior in all aspects of treatment decision-making and patient care.
2- Demonstrating commitment to patient safety.
3- Evidence-based practice.
4- Respect the patient's autonomy and preferences.
5- Collaborate effectively with other healthcare professionals for the best interest of the patient.

Teaching and Learning Methods

1- Case studies
2- Discussions
3- Lectures
4- Training and interaction in the hospital and community pharmacy
5- Assignments
6- PowerPoint presentation

Assessment methods

19. Observing students' interaction with patients
20. Case-based scenarios

21. Homework
22. Electronic MCQs on the electronic platform
23. Mid-term exam
24. Final exam

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1. Raising students on ethical and professional work.
2. Developing students' sense of responsibility during the period of study and work.
3. Supporting medication and pharmacy practice culture among students and community members.
4. Enhancing the spirit of cooperation and teamwork among students.

10. Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1, A2, A3, B1, B2	Overview of Pharmacoeconomics	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1, A2, A3, B1, B2	Measuring and estimating costs.		
3.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Critiquing research article.		
4.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Cost-minimization analysis		
5.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Cost-effectiveness analysis		
6.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Cost-utility analysis		
7.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Cost benefits analysis		
8.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Health-related. quality of life.		
9.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Decision analysis		
10.	2	A1, A2, A3, B1, B2, C1, C3, D3, d4, D5	Markov modeling, Retrospective databases		
11	2	A1, A2, A3, B1, B2	Pharmacy services.		
12		A1, A2, A3, B1, B2	Introduction to pharmacoepidemiology		
13	2		Project discussion		

11. Infrastructure	
Books Required reading	Bootman JL, Townsend RJ, McGhan WF, (Eds.), Principles of Pharmacoeconomics, the latest ed., Harvey Whitney Books Company, Cincinnati, Oh, the latest edition.
Main references (sources)	Bootman JL, Townsend RJ, McGhan WF, (Eds.), Principles of Pharmacoeconomics, the latest ed., Harvey Whitney Books Company, Cincinnati, Oh, the latest edition.
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	

12. Course development plan

COURSE SPECIFICATION

The hospital training is designed to delve into the practical aspects of clinical pharmacy practice within a hospital environment. Through a combination of theoretical learning and hands-on experience, students will develop proficiency in various clinical pharmacy activities, including medication reconciliation, therapeutic monitoring, patient counselling, and interprofessional collaboration. Throughout the course, students will engage in real-life scenarios and case studies, allowing them to apply theoretical concepts to practical situations commonly encountered in hospital pharmacy practice.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Clinical pharmacy
3. Course title/code	Hospital training /PH5205
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	4 hr / week
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

1. Teach students to apply pharmacy practice to different hospital wards. It includes training on evaluating and following up the condition, evaluating therapeutic regimens, recording errors related to drug treatment, and providing ideas to solve problems.

9. Learning Outcomes, Teaching, Learning and Assessment Method

A. Cognitive goals

1. Studying the different types of minor illnesses and how to deal with them in the pharmacy and hospital.
2. Study of various diseases (causes, symptoms, diagnosis, and treatment).
3. Study the communication skills necessary for the work of a pharmacist.

B. The skills goals special to the course

1- Communication skills with patients
2- The skill of medication counseling and education for patients
3- The skill of extracting the required information from approved sources.

Teaching and Learning Methods

1- Hospital training
2- discussion
3- Presentation of cases
4- Handouts

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

C. Affective and value goals

1- Adhere to the highest standards of ethical and professional behavior in all aspects of treatment decision-making and patient care.
2- Demonstrating commitment to patient safety.
3- Evidence-based practice.
4- Respect the patient's autonomy and preferences.
5- Collaborate effectively with other healthcare professionals for the best interest of the patient.

Teaching and Learning Methods

1- Case studies
2- Discussions
3- Lectures
4- Training and interaction in the hospital and community pharmacy
5- Assignments
6- PowerPoint presentation

Assessment methods

25. Observing students' interaction with patients

26. Case-based scenarios
27. Homework
28. Electronic MCQs on the electronic platform
29. Mid-term exam
30. Final exam

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1- Determine the appropriate medication for a single or multiple medical condition.
2- Determine the appropriate medications used to manage individual or multiple clinical conditions (treating the patient as a whole and not as a single disease).
3- Demonstrate the ability to communicate verbally and in writing
4- Choosing the appropriate medication for the studied diseases according to their causes and pathophysiology.
5- Engage effectively in a range of independent roles and discuss in an important way. Produce coherent reports in accordance with professional standards; Deliver high quality oral presentations and other presentations.
6- Solve problems and design treatment plans and timetables to achieve goals on time.
7- To be able to work in the hospital's pharmacy and specialized lobbies

10. Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Internal Medicine: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Internal Medicine: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
3.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Internal Medicine: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
4.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in surgery: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
5.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in surgery: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
6.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in surgery: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
7.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
8.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
9.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in Paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		

10.	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
11	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		
12	4	A1, A2, A3, B1, B2, B3 D1, D2, D3, D4, D5, D6,	Clinical Pharmacy Practice in paediatrics: Clinical observation of cases; evaluation of the case sheets; case presentation; discussion and evaluation		

11. Infrastructure	
Books Required reading	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 11th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition. BNF latest edition
Main references (sources)	1- Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 11th Edittion. 2- Chisholm-Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition 3. Pharmacotherapy casebook: a patient focused approach,Mcgraw Hill) 4- Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics 6th edition. BNF latest edition
Recommended books and references (scientific journals, reports…).	Journal of Clinical pharmacy and therapeutics International journal of clinical pharmacy
Electronic references, Internet sites…	UpToDate Lexicomp

12. Course development plan
Not available

The coarse enable technical setup for coordination of standards for formulation of typical dosage forms and the principles needed to learn mass production of different pharmaceutical dosage forms. The syllabus includes different dosage forms like tablets, capsules, aerosols, emulsion, etc, besides the advanced techniques like enteric coating and micro-encapsulation.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	pharmaceutics
3. Course title/code	Industrial pharmacy 2/ PH5102
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	first semester 2023-2024
6. Credits (total)	45 hr theory & 30 hr practical/ semester
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

In the theoretical part: This semester, different types of pharmaceutical forms and methods are covered. There are also different materials included in their production and quality control for each of these types.

In the practical part: experiments are conducted on how to compress Tablets using different manufacturing methods, in addition to methods, Various evaluations of tablets, such as examining decomposition, brittleness, and fragmentation, as well as experiments on manufacturing methods of Capsules conducted and methods for making injections and nebulizers

9. Learning Outcomes, Teaching, Learning, and Assessment Method

• Preparation of formulation standards for standard dosage forms.
• Learn the principles necessary for mass production of various pharmaceutical forms

A- Cognitive goals

1- **Enabling students to learn about tablet manufacturing methods**
2- **Enable students to learn how to evaluate grains**
3- **Enabling students to learn about the different methods of packaging tablets**
4- **Enabling students to learn about the capsule industry**
5- **Enabling students to learn about the microcapsule industry**
6- **Enabling students to identify semi-solids**

B- The skills goals special to the course

1 – Enabling students to acquire tablet manufacturing skills
2 - Enabling students to possess the skills of measuring and controlling the release of medicine and its disintegration from pills
3 - Enabling students to acquire capsule manufacturing skills
4- Enabling students to possess the skills of measuring and controlling the release of the drug and its disintegration from the capsule

Teaching and Learning Methods

Lectures
PowerPoint presentation

Assessment methods

1- Short tests
2- Oral exam and direct questions
3- Mid-term exam
4- Final exam

C- Affective and value goals

1- Raising students on professional humanitarian work and promoting and consolidating professional and controversial values among students To practice the profession of pharmacy
2- Raising students on the culture of integrity and fighting corruption in all its forms
3- training students to respect the rights of the beneficiaries of their profession, their culture, religion, gender, race, and training Students respect the freedom of thought, expression, and creativity of others
4- Developing students' sense of responsibility during the study period and work and enhancing the spirit of Cooperation and teamwork among students
5- Supports drug culture among students and community members

Teaching and Learning Methods

1- Group discussions
2- Lectures

Assessment methods

1- Case-based scenarios
2- Homework

D- General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1- Using sources from the Internet

D2 - Conducting a research study

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	3	A2,A3,B2,B4,C1,D1,D4	Tablets: Introduction	Lectures Discussion Data show	Written and oral exams and direct questions
2.	3	A2,A3,B2,B4,C1,D1,D4	Tablets Manufacturing: Knowing the different methods used in the manufacturing of tablets		
3.	3	A2,A3,B2,B4,C1,D1,D4	Evaluation of Tablets: Knowing the different methods used in the manufacturing of tablets		
4.	3	A2,A3,B2,B4,C1,D1,D4	Problems of Tabletting: Identification of problems associated with tablets manufacturing		
5.	3	A2,A3,B2,B4,C1,D1,D4	Tablets Coating: Knowing the reasons behind coating and the different methods used for coating		
6.	3	A2,A3,B2,B4,C1,D1,D4	Quality Control of Tablets: Identification of tests used to evaluate the prepared tablets		
7.	3	A2,A3,B2,B4,C1,D1,D4	Hard Gelatin Capsule: Definition of hard gelatin capsules and its manufacturing methods		
8.	3	A2,A3,B2,B4,C1,D1,D4	Evaluation of Hard Gelatin Capsule: Identification of tests used to evaluate the hard gelatin capsules		
9.	3	A2,A3,B2,B4,C1,D1,D4	Soft Gelatin Capsules: Definition of hard gelatin capsules and its Manufacturing methods		
10.	3	A2,A3,B2,B4,C1,D1,D4	Evaluation of Soft Gelatin Capsules: Identification of tests		

			used to evaluate the soft gelatin capsules		
11	3	A2,A3,B2,B4,C1,D1,D4	Microencapsulation: Definition of microencapsulation and its types with manufacturing methods		
12	3	A2,A3,B2,B4,C1,D1,D4	Semisolids: Knowing the manufacturing methods and factors affecting their activity		
13	3	A2,A3,B2,B4,C1,D1,D4	Evaluation of Semisolids: Identification of tests used to Evaluate semisolids		
14	3	A2,A3,B2,B4,C1,D1,D4	Aerosols: Knowing the Manufacturing methods of aerosols		

10. Laboratory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1-3	6	A2,A3,B2,B4,C1,D1,D4	Tablets dosage forms: Direct compression method for preparation of tablets	Lectures Discussion Data show	Written and oral exams and direct questions
4-6	6	A2,A3,B2,B4,C1,D1,D4	Tablets dosage forms: Wet granulation method for preparation of tablets		
7-9	6	A2,A3,B2,B4,C1,D1,D4	Tablets dosage forms: Dry granulation method for preparation of tablets		
10-11	4	A2,A3,B2,B4,C1,D1,D4	Tablets dosage forms: Evaluation of tablets		
12-13	4	A2,A3,B2,B4,C1,D1,D4	Capsules dosage forms: Capsules dosage form: Preparation and evaluation		
14-15	4	A2,A3,B2,B4,C1,D1,D4	Parenteral dosage forms		

11. Infrastructure	
Books Required reading	Leon Lachman, “The Theory and practice of industrial pharmacy”
Main references (sources)	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3ed Michael E. Aulton (Author). Churchill, Livingstone- Elsevier
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	

12. Course development plan
Adding new experiments concerning practical works in laboratory

This course enables students to understand the principles and factors that influence design dosage forms; and the applications of these principles in the practice of pharmaceutical industry.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	pharmaceutics
3. Course title/code	Dosage form design PH5206
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	30 hr theory

7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

Clarify the principles of drug dosage design and the factors affecting them and The use of these foundations in pharmaceutical industry applications

9. Learning Outcomes, Teaching, Learning, and Assessment Method

A- Cognitive goals

Enabling students to learn the history of the emergence of pharmacy and pharmaceutical constitutions
2- Enabling students to learn about drug development and the stages of market approval
3-Enabling students to obtain and understand good industrial standards and effective drug formulations
4- Enabling students to achieve and understand pharmaceutical standards in drug design
5- Enabling students to achieve and understand the standards of biological pharmacy and pharmacokinetics

B- The skills goals special to the course

1- Enabling students to acquire skills in solving mathematical problems
2- Enabling students to acquire the skills of making a presentation on a scientific topic
3- Enabling students to acquire the skills of writing scientific reports
4- Enabling students to acquire the capabilities of debate in small groups

Teaching and Learning Methods

1- Use of smart boar and white board

Assessment methods

1- Short tests
2- Oral exam and direct questions
3- Mid-term exam
4- Final exam

C- Affective and value goals

1- Encouraging students on humanitarian work and promoting and consolidating professional and ethical values
2- Educating students on a culture of integrity and combating corruption in all its forms
3- Training students to respect the rights of the beneficiaries of their profession, their culture, religion, gender, and ethnicity, and training students to respect the freedom of thought, expression, and creativity in others
4- To develop in students a sense of responsibility during the study period and work and to enhance the spirit of cooperation and teamwork among the students
5- Educate communities on drug culture

Teaching and Learning Methods

1- Group discussions
2- Power Point lectures

Assessment methods

1- Case-based scenarios
2- Homework

D- General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1- Using sources from the Internet

D2 - Conducting a research study

10. Theory Course Structure					
Week	**Hrs.**	**ILOs**	**Unit/Module or Topic Title**	**Teaching methods**	**Assessment methods**
1.	2	A2,A3,B6,D1,D2,D4,D5	Introduction to pharmacy: History of pharmacy and pharmacopeia	Lectures Discussion Data show	Written and oral exams and direct questions
2.	2	A2,A3,B6,D1,D2,D4,D5	Regulation laws on drugs: All laws related to drug development		
3.	2	A2,A3,B6,D1,D2,D4,D5	Development of new drugs and approval process: new drug applications		
4.	2	A2,A3,B6,D1,D2,D4,D5	Drug identification according to FDA: Examples of new drugs		
5.	2	A2,A3,B6,D1,D2,D4,D5	Good manufacturing practice principle		
6.	2	A2,A3,B6,D1,D2,D4,D5	Good manufacturing practice principle		
7.	2	A2,A3,B6,D1,D2,D4,D5	Dosage form design Pharmaceutical principles: The reason for dosage forms		
8.	2	A2,A3,B6,D1,D2,D4,D5	Dosage form Design pharmaceutical principles: Physical principles		
9.	2	A2,A3,B6,D1,D2,D4,D5	Dosage form design Pharmaceutical principles; Physical principles		
10.	2	A2,A3,B6,D1,D2,D4,D5	Formulation principles :Excipients		
11	2	A2,A3,B6,D1,D2,D4,D5	Formulation principles: Coloring and flavoring agents		
12	2	A2,A3,B6,D1,D2,D4,D5	Biopharmaceutics principles: Drug absorption		
13	2	A2,A3,B6,D1,D2,D4,D5	Biopharmaceutics principles: Drug metabolism		

14	2	A2,A3,B6,D1,D2,D4,D5	Pharmacokinetics: Bioequivalency and comparing different dosage forms		
15	2	A2,A3,B6,D1,D2,D4,D5	Pharmacokinetics: Calculation of the expiration date of medications		

11. Infrastructure	
Books Required reading	Shargel L., Yu AB., (Eds). Applied Biopharmaceutics and Pharmacokinetics
Main references (sources)	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd ed. Michael E. Aulton (Author) Churchill Livingstone- Elsevier
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	

12. Course development plan
none

The course provide information about Formulation of biotechnology product from biopharmaceutical Consideration and different rout of administration with their problems

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	pharmaceutics
3. Course title/code	Pharmaceutical biotechnology PH5207
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	Second semester 2023-2024
6. Credits (total)	15 hr theory
7. Date of description form preparation//Revision of this specification	1/10/2023

8. Course Objectives

there would be an introduction to pharmaceutical biotechnological science, along with the types and uses of biotechnological products in medicine. It covers the formulation aspect of biotechnological products into pharmaceutical dosage form and the methods of administration, what are the obstacles, and how to overcome them.

Moreover, it covers studying the pharmacokinetics of biotechnological products inside the human body.

9. Learning Outcomes, Teaching, Learning, and Assessment Method

A- Cognitive goals

1- Enable students to learn about pharmaceutical biotechnological products such as proteins
2- Enable students to collect and understand information on the basic principles of the formulation and preparation of pharmaceutical biotechnological products and biopharmaceuticals
3- Enable students to learn about freezing drying technology and excipients that are used in protein formulation through this technique
4- Enable students to collect and understand information about the traditional and alternative methods used to deliver protein to the body

B- The skills goals special to the course

1- Enabling students to have problem-solving capabilities during the preparation of pharmaceutical biotechnological products
2- Enabling students to have the ability to formulate therapeutic proteins
3- Enable students to acquire the skills to give presentations on specific topics
4- Enable students to acquire scientific reporting skills

Teaching and Learning Methods

1. Use smart blackboard
2. video demonstration of practical experiments
3. Writing scientific reports on certain problems

Assessment methods

1- Short tests
2- Oral exam and direct questions
3- Mid-term exam
4- Final exam

C- Affective and value goals

1. Raising students for professional human work and promoting and consolidating professional and moral values when students practice the profession of pharmacist
2. Educating students on the culture of integrity and fighting corruption in all its forms
3. Training students to respect the rights of the beneficiaries of their profession, culture, religion, gender, and race, and to train students to respect the freedom of thought, expression and creativity of others.
4. Develop a sense of responsibility when students feel responsible during the study period and work and promote the spirit of cooperation and teamwork when students

Teaching and Learning Methods

1- Using the strategy of cooperation and assistance during the education process
2 field visits to relevant ministries and educational institutions
3. Holding seminars, courses, and workshops for students that stimulate spiritual values
4. Forming a discussion group during the lecture

5. Assigning students to duties that require subjective interpretation
Assessment methods 1 Semester and final exams 3. Short exams 4. Discussion in small groups 5. Powerpoint presentation
D- General and rehabilitative transferred skills (other skills relevant to employability and personal development) **D1- Using sources from the Internet** **D2 - Conducting a research study**

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	1	A5,B3,C5,D1,D2,D4,D5	Introduction to biotechnology	Lectures Discussion Data show	Written and oral exams and direct questions
2-4	3	A5,B3,C5,D1,D2,D4,D5	Formulation of pharmaceutical biotechnology: Microbiological concerns Sterilization of final Product Removal of pyrogen		
5-7	3	A5,B3,C5,D1,D2,D4,D5	The components of parenteral dosage form: Excipients in parenteral dosage form of Bioproduct Antioxidant Solubility enhancer Antiadsorpant		
8	1	A5,B3,C5,D1,D2,D4,D5	Preservatives and osmotic agents Freeze drying		
9	1	A5,B3,C5,D1,D2,D4,D5	Protein delivery: Parenteral administration		
10	1	A5,B3,C5,D1,D2,D4,D5	Alternative routes of Administration: Cos and pros for the alternative route of administrations		
11	1	A5,B3,C5,D1,D2,D4,D5	Pharmacokinetics of protein and therapeutic peptides		
12	1	A5,B3,C5,D1,D2,D4,D5	Pharmacokinetic : volume of distribution		
13	1	A5,B3,C5,D1,D2,D4,D5	Pharmacokinetic: metabolism of protein		
14	1	Pharmacokinetic: elimination of protein via kidney	Pharmacokinetic		
15	1	Pharmacokinetic (elimination of protein via liver)	Pharmacokinetic		

11. Infrastructure	
Books Required reading	**1.Pharmaceutical biotechnology by J.A. Crommelin, Robert D. Syinder.** **2.Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3ed Michael E. Aulton (Author). Churchill, Livingstone- Elsevier**
Main references (sources)	
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	

12. Course development plan
Special needs (including, for example, workshops, courses, IT programs and websites)

COURSE SPECIFICATION

This course description provides a necessary summary of the most important characteristics of the course and the learning results expected from the student to achieve, demonstrating whether he has achieved the maximum benefit from the available learning opportunities. It must be linked to the program description.

1. Educational institution	Alayen Iraqi University - College of Pharmacy
2. College department/Center	Pharmacology & Toxicology
3. Course title/code	Clinical Toxicology\PH5106
4. Modes of Attendance offered	Full-time and official attendance hours
5. Semester/Year	First semester 2023-2024
6. Credits (total)	2 hr x 15 weeks = 30 hrs
7. Date of description form preparation//Revision of this specification	1/10/2023
8. Course Objectives	
4. The current course enables students to study management of poisoning cases, antidotes of drugs, decontamination and enhancement of elimination of toxicant agents.	

9. Learning Outcomes, Teaching, Learning and Assessment Method

M. Cognitive goals

1. Identify the main concepts in assessment and management of poisoning cases
2. Study the toxiccodynamics of drugs
3. study toxic effects of drugs and toxicant substances
4. study the antidotes of drugs

N. The skills goals special to the course

1. Empowering students to possess skills in conducting clinical experiments.
2. Empowering students to possess skills in dialogue, discussion and listening to others.

Teaching and Learning Methods

1- PowerPoint and Multimedia presentation
2- Class discussion
5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

Assessment methods

1- Short MCQs
2- Oral exam and direct questions in the class
3- Midterm exam
4- Electronic exams on the electronic platform
5- Final exam

O. Affective and value goals

1- Adhere to the highest standards of ethical and professional behavior in all aspects of treatment decision-making and patient care.
2- Evidence-based practice.
3- Collaborate effectively with other healthcare professionals for the best interest of the patient.

Teaching and Learning Methods

1- Lectures
2- PowerPoint presentation

Assessment methods

1. Case-based scenarios
2. Theoretical and practical exams

P. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1. Determine the appropriate medication at the appropriate dose for an individual or multiple disease condition.
2. Solve problems and design treatment plans and schedules to achieve goals on time.
3. To be able to work in the hospital's pharmacy and specialized departments.

10. Theory Course Structure

Week	Hrs.	ILOs	Unit/Module or Topic Title	Teaching methods	Assessment methods
1.	2	A1,A2,A3,A4,B1,B3,B4,B5, C3,C4,D1,D3,D5	Introduction of clinical toxicology	1- Whiteboard and PowerPoint and data show presentation 2- Class discussion 3- Presentation of cases 4- Handouts 5- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams	1- Short MCQs 2- Oral exam and direct questions in the class 3- Midterm exam 4- Electronic exams on the electronic platform 5- Final exam
2.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Initial evaluation and management of poisoned patients		
3.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Amphetamines overdose		
4.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Paracetamol, aspirin, overdose		
5.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Opioids overdose		
6.	2	A1,A2,A3,A4,B1,B3,B4,B5,C3, C4,D1,D3,D5	Digoxin and calcium channel blockers toxicity		
7.	2	A1,A2,A3,A4,B1,B3,B4,B5, C3,C4,D1,D3,D5	Caffeine, theophylline and antihistamine toxicity		
8.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Tricyclic antidepressants toxicity		
9.	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Beta blockers toxicity		
10.	2	A1,A2,A3,A4,B1,B3,B4,B5,C3, C4,D1,D3,D5	Botanicals and plants-derived toxins		
11	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Alcohol (ethanol, methanol) poisoning		
12	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Drug toxicity: anticholinergic, nonsteriodal anti-inflammatory		
13	2	A1,A2,A3,A4,B1,B3,B4,B5,C3, C4,D1,D3,D5	Chemical and environmental toxins		
14	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Chelating agents		
15	2	A1,A2,A3,A4,B1,B3,B4,B5,C 3,C4,D1,D3,D5	Drug of abuse		

11. Infrastructure	
Books Required reading	Principles of Clinical Toxicology, latest edition Handbook of Medicinal Toxicology, latest edition
Main references (sources)	Principles of Clinical Toxicology, latest edition Handbook of Medicinal Toxicology, latest edition
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	