

## Academic Program Description Form

University Name: Al-Nahrain

Faculty/Institute: College of Pharmacy

Scientific Department: Pharmaceutics Department

Academic or Professional Program Name: Pharmaceutics

Final Certificate Name: Bachelor's Degree

Academic System: Courses

Description Preparation Date: 2/1 /2026

File Completion Date: 15/1 /2026

Signature

Head of Department Name:

Assist. Prof. Dr. Yasir Qasim

Mohammed

Date: 25. 2. 2. 26

Signature:

Scientific Associate Name:

Assistant Professor

Dr. Shaimaa Hussein Hammoudi

Date: 8/31/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Dr. Noor Adil Abood

Date: 8/31/2026

Signature:



Approval of the Dean

Professor Dr. Hayder Bahaa Sahib



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



# **Academic Program and Course Description Guide**

**2025**

## **Introduction:**

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

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

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

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

## **Concepts and terminology:**

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

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

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

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

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

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

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

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

### **1. Program Vision**

The vision of the pharmaceuticals department is to focus on innovative work in research and education related to pharmaceuticals and drug delivery to achieve superiority in this respect.

### **2. Program Mission**

The mission of the pharmaceuticals department involves two targets one related to the education and training mission and the other related to the research and innovation mission, the first target is attained by offering undergraduate and postgraduate students essential knowledge for understanding the physicochemical and biopharmaceuticals aspect of dosage form design, evaluation and manufacturing whereas the second target accomplished by performing and directing new knowledge to external partner to amend drug delivery and patient care.

### **3. Program Objectives**

- 1/Submit education and training on scientific courses organized by the department
- 2/ impart professional skill in drug preparation, synthesis, and evaluations
- 3/Offer scientific concepts essential for lifelong learning and valuable knowledge for rationale, effectiveness, and safety of the drugs
- 4/Create synchronized between course learning outcome and graduate attribute properties
- 5/Activate the role of the department in high-quality research and innovation

#### 4. Program Accreditation

Do not have program accreditation? And from

#### 5. Other external influences

Is there a sponsor for the program?

#### 6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	10	43	20%	basic
College Requirements	10	43	20%	basic
Department Requirements	10	43	20%	basic
Summer Training	2	–	–	–
Other				

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

#### 7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First	10301109	pharmaceutical calculation	3	2
Second	10301218	Physical pharmacy I	3	2
	10301225	Physical pharmacy II	3	2
Third	10301334	Pharmaceutical technology	3	2
	10301339	Pharmaceutical and cosmetic preparation	3	2
Forth	10301447	Biopharmaceutics	2	2
	10301454	Industrial Pharmacy I	3	2
Fifth	10301557	Industrial Pharmacy II	3	2

	10301568	Drug delivery system design	2	-
	10301569	Pharmaceutical Biotechnology	1	-

### 8. Expected learning outcomes of the program

Knowledge	
<p>1. Identify the types and forms of medicines.</p> <p>2. Methods for preparing the active substances in the form of full drug doses</p> <p>3. Studying the stability of doses prepared in various forms.</p>	<p>4. Studying the pharmacological effect, its effectiveness, and its mechanism of action inside the body.</p>
Skills	
<p>1/The skills goals are special to the course.</p> <p>2/Acquisition of skills in installation and preparation methods</p> <p>3/ Acquiring the skill of knowing how to maintain stability for as long as possible</p>	<p>4/ Acquisition of skill in diagnosing separated compounds</p>
Ethics	
<p>Methods for preparing the active substances in the form of full drug doses</p>	<p>Studying the pharmacological effect, its effectiveness, and its mechanism of action inside the body.</p>
<p>Studying the stability of doses prepared in various forms.</p>	

### 9. Teaching and Learning Strategies

PowerPoint Presentation, Tutorials (Pen and Whiteboard), Problem Solving, Practicalities  
Scientific research, Laboratory teaching

## 10. Evaluation methods

Quizzes  
reports  
Midterm Exam  
Final Exam

## 11. Faculty

### Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
	Pharmacy	Pharmaceutics	-	-	8	0

### Professional Development

#### Mentoring new faculty members

This section provides a brief description of the procedures used to mentor new, visiting, full-time, and part-time faculty members at both the institutional and departmental levels. The mentoring program includes guidance on academic and administrative policies, orientation on course content, teaching methods, and assessment strategies. It also involves academic and professional support through supervision by experienced faculty members, with the aim of facilitating their integration into the academic environment and enhancing their teaching performance.

#### Professional development of faculty members

This section outlines the academic and professional development plans and arrangements established for faculty members. The institution and department support continuous professional growth through structured programs and activities, including workshops on modern teaching and learning strategies, seminars on assessment of learning outcomes, and training sessions on curriculum development and instructional technologies. Faculty members are also encouraged to participate in research activities, attend scientific conferences, and engage in community service. These initiatives aim to enhance teaching effectiveness, promote innovative practices, and ensure alignment with national and international academic standards.

## 12. Acceptance Criterion

Central admission

## 13. The most important sources of information about the program

British Pharmacopeia

United state pharmacopeia

European pharmacopeia

Applied Biopharmaceutics and Pharmacokinetics

Shargel and yus

Pharmaceutical Calculation by Stoklosa

Physical Pharmacy by Alfred Martin et al.

Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel;  
latest edition. And Sprowel's American Pharmacy.

Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.

The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.

## 14. Program Development Plan

Personal development - increasing knowledge - scientific discussions - cultural events

### Program Skills Outline

				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First	10301109	Pharmaceutical Calculation	Basic	√	√	√	√	√	√	√		√	√	√	√
Second	10301218	Physical pharmacy I	Basic	√	√	√	√	√	√	√		√	√	√	√
	10301225	Physical pharmacy II	Basic	√	√	√	√	√	√	√		√	√	√	√
Third	10301334	Pharmaceutical technology	Basic	√	√	√	√	√	√	√		√	√	√	√
	10301339	Pharmaceutical and cosmetic prepration	Basic	√	√	√	√	√	√	√		√	√	√	√
Fourth	10301447	Biopharmaceutic	Basic	√	√	√	√	√	√	√		√	√	√	√
	10301454	Industrial pharmacy I	Basic	√	√	√	√	√	√	√		√	√	√	√
Fifth	10301557	Industrial Pharmacy II	Basic	√	√	√	√	√	√	√		√	√	√	√

	10301568	Drug delivery system design	<b>Basic</b>	√	√	√	√	√	√	√		√	√	√	√
	10301569	Pharmaceutical Biotechnology	<b>Basic</b>	√	√	√	√	√	√	√		√	√	√	√

## Course Description Form

<b>1. Course Name:</b>					
Pharmaceutical Calculation					
<b>2. Course Code:</b>					
10301109					
<b>3. Semester / Year:</b>					
2 <sup>nd</sup> semester/ 1 <sup>st</sup> year					
<b>4. Description Preparation Date:</b>					
20/11/2025					
<b>5. Available Attendance Forms:</b>					
Theory-laboratory/ Attendance					
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>					
60					
<b>7. Course administrator's name (mention all, if more than one name)</b>					
Name: lec. Dr. Maher abdulrazzaq As. Lec. Ali Raaed As. Lec. Meena raaed					
<b>8. Course Objectives</b>					
<b>Course Objectives</b>		1/ Learn the rules of mathematic calculations. 2/ Learn the rules of components and types of prescriptions. 3/ Learn the rules of calculating doses and reducing or enlarging formulas. 4/ Learn the rules of value description in percentage and strength.			
<b>9. Teaching and Learning Strategies</b>					
<b>Strategy</b>	PowerPoint Presentation, Tutorials (Pen and Whiteboard), Problem Solving, Practicalities Scientific research Laboratory teaching				
<b>10. Course Structure</b>					
<b>Week</b>	<b>Hours</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>

1-5	10	Calculate solution concentration	Dilution and concentration pharmaceutical preparations.	PowerPoint, Problem Solvi Practicalities	Formative, summative, qu exam
6-8	6	Prepare isotonic formulations	Isotonic solutions.	PowerPoint, Problem Solvi Practicalities	Formative, summative, qu exam
<b>Midterm Exam</b>					
9-11	6	Understand electrolyte concepts	Electrolyte solutions (milliequivalents, millimoles and milliosmoles).	PowerPoint, Problem Solvi Practicalities	Formative, summative, qu exam
12-15	8	Prepare constituted solutions	Constituted solutions.IV admixtures and flow rate calculations.	PowerPoint, Problem Solvi Practicalities	Formative, summative, qu exam

**Final Exam**

**11. Course Evaluation**

Quizzes 5%  
 Reports 5%  
 Mid-term Exam 30%  
 Final Exam 60%

**12. Learning and Teaching Resources**

Required textbooks (curricular books, if any)	Pharmaceutical Calculation by Stoklosa
Main references (sources)	Pharmaceutical Calculation by Stoklosa
Recommended books and references (scientific journals, reports...)	Maths skills for pharmacy by Chris Lang
Electronic References, Websites	Oxford university press

## Course Description Form

<b>13. Course Name:</b>	
Physical pharmacy I	
<b>14. Course Code:</b>	
10301218	
<b>15. Semester / Year:</b>	
1 <sup>st</sup> semester/ 2 <sup>nd</sup> year	
<b>16. Description Preparation Date:</b>	
20/11/2025	
<b>17. Available Attendance Forms:</b>	
Theory and Practical/ Attendance	
<b>18. Number of Credit Hours (Total) / Number of Units (Total)</b>	
45	
<b>19. Course administrator's name (mention all, if more than one name)</b>	
Name: As. Prof. Amera Abdulallah Rahdi As. Lec. Abdulla Qussay	
<b>20. Course Objectives</b>	
<b>Course Objectives</b>	1) Understand the states of matter, molecular interactions, and phase equilibria, including the phase rule and thermal analysis techniques. 2) Analyze the properties of non-electrolyte solutions, including colligative behavior and methods for molecular weight determination. 3) Study the behavior of electrolyte solutions, applying theories of dissociation, ionic strength, and colligative property expressions. 4) Explore solubility and distribution phenomena, focusing on solute-solvent interactions and partitioning between immiscible phases. 5) Apply principles of ionic equilibria, acid-base theories, pH calculations, and the effect of ionic strength on solution behavior. 6) Understand the formulation and function of buffered and isotonic solutions in maintaining and physiological compatibility.
<b>21. Teaching and Learning Strategies</b>	
<b>Strategy</b>	PowerPoint Presentation, Tutorials (Pen and Whiteboard), Problem Solving Practicalities
<b>22. Course Structure</b>	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	States of matter	States of matter, binding forces between molecules,	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
2	3	States of matter	State of gases, liquids, solid and crystalline matters; phase equilibria and phase rule; thermal analysis.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
3	3	States of matter	Liquid crystalline state, liquid equilibrium, condense system	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
4	3	Nonelectrolytes	Physical properties of substances Types of solutions Concentration expressions	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
5	3	Nonelectrolytes	Ideal and real solutions Colligative properties Molecular weight determination.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
6	3	Electrolyte solutions	Properties of solutions of electrolytes Theory of dissociation Theory of strong electrolytes	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
7	3	Electrolyte solutions	Ionic strength The Debye- Hückel theory Coefficients for expressing colligative properties	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
8			Midterm Exam		
9	3	Solubility and distribution phenomena	Introduction Solvent-solute interactions Solubility of liquids in liquids	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
10	3	Solubility and distribution phenomena	Solubility of solids in liquids Determining thermodynamic and kinetic solubility Poor aqueous solubility	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

11	3	Solubility and distribution phenomena	Measuring solubility Distribution of solutes between immiscible solvents	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
12	3	Ionic equilibria	Introduction Brønsted–Lowry theory Ionization and dissociation	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
13	3	Ionic equilibria	Classification of solvent Lewis electronic theory Acid-base equilibria Calculation of pH and acidity constants	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
14	3	Buffered and isotonic solutions	The buffer equation Buffer capacity	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
15	3	Buffered and isotonic solutions	Buffers in pharmaceutical and biological systems	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
			Final Exam		

### 23. Course Evaluation

Quizzes 5%  
reports 5%  
Midterm Exam 30%  
and Final Exam 60%

### 24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Physical Pharmacy by Alfred Martin et al.
Main references (sources)	Physical Pharmacy by Alfred Martin et al.
Recommended books and references (scientific journals, reports...)	Theory and Practice of Physical Pharmacy by Gaurav Jain, Roop Krishen Khar, Farhan J. Ahr
Electronic References, Websites	<a href="https://www.kobo.com/us/en/ebook/theory-and-practice-of-physical-pharmacy-e-book">https://www.kobo.com/us/en/ebook/theory-and-practice-of-physical-pharmacy-e-book</a>

## Course Description Form

<b>25. Course Name:</b>					
Physical pharmacy II					
<b>26. Course Code:</b>					
10301225					
<b>27. Semester / Year:</b>					
2 <sup>nd</sup> semester/ 2 <sup>nd</sup> year					
<b>28. Description Preparation Date:</b>					
20/11/2025					
<b>29. Available Attendance Forms:</b>					
Theory and Practical/ Attendance					
<b>30. Number of Credit Hours (Total) / Number of Units (Total)</b>					
45					
<b>31. Course administrator's name (mention all, if more than one name)</b>					
Name: As. Prof. Yassir Qassim Mohammed As. Lec. Ali Qassim					
<b>32. Course Objectives</b>					
<b>Course Objectives</b>		<ul style="list-style-type: none"> <li>• Provide students with a comprehensive understanding of the physicochemical principles underlying pharmaceutical systems.</li> <li>• Develop the ability to analyze the solubility, partitioning, and distribution behavior of drugs.</li> <li>• Enhance knowledge of thermodynamics, phase equilibria, and their relevance to drug formulation.</li> <li>• Introduce concepts of chemical kinetics and stability of pharmaceutical products.</li> <li>• Explain interfacial phenomena and their applications in drug delivery systems.</li> <li>• Strengthen skills in performing pharmaceutical calculations related to solubility, pH, buffer systems, and kinetics.</li> <li>• Foster critical thinking and problem-solving in evaluating pharmaceutical formulations and physical processes.</li> </ul>			
<b>33. Teaching and Learning Strategies</b>					
<b>Strategy</b>		PowerPoint Presentation, Tutorials (Pen and Whiteboard), Problem Solving, Practicalities			
<b>34. Course Structure</b>					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-2	6	Complexation	Classification of complexes Metal complexes Organic molecular complexes. Inclusion compounds Methods of analysis	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
3-4	6	Diffusion	Introduction Steady state diffusion Fick's first law of diffusion Fick's second law Diffusion through membranes Permeability Diffusion driving forces Lag time Apparatus and methods for assessing drug diffusion	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
5-6	6	Chemical kinetics and stability	Introduction Rates, orders and molecularity of reactions Temperature effects Other factors effects Stability of pharmaceuticals Accelerated stability and stress testing	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
7-8	6	Interfacial phenomena	Interfacial phenomena Classification of interfaces Liquid interfaces Surface and interfacial tensions Surface free energy Measurement of interfacial tension Spreading coefficient Adsorption at liquid interfaces Surface active agents Systems of Hydrophile-Lipophile Classification Adsorption at solid interfaces The solid gas interface The solid liquid interface Wetting and wetting agents Applications of surface-active agents Foam and antifoaming agents Electric properties of interfaces	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Midterm exam					

9,10	6	Rheology	Newtonian systems Non-Newtonian systems Thixotropy Determination of rheological properties Viscoelasticity Pharmaceutical areas in which rheology is Significant	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
11-12	6	Colloidal dispersions	Introduction to disperse systems Types of colloidal systems Optical properties of colloids Kinetic properties of colloids Electrical properties of colloids Solubilization using colloids Pharmaceutical applications of colloids	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
13-14	6	Micrometrics	Particle size and size distribution Methods of determining particle size Particle shape and surface area Methods for determining surface area Derived properties of powders (porosity, packing arrangements, densities of particles, bulkiness and flow properties)	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
15	3	Pharmaceutical polymers	Introduction (history, general concepts, synthesis) Copolymers and polymer blends Thermoplastic and thermoset polymers Polymer properties (crystalline and amorphous polymers, thermal transitions, glass transition temperature, plasticized polymers, molecular weight, mechanical properties, Polymers for pharmaceutical applications Polymers in drug delivery	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
			<b>Final Exam</b>		

### 35. Course Evaluation

Quizzes, 5%

reports, 5%  
Midterm Exam, 30%  
and Final Exam 60%

### 36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Physical Pharmacy by Alfred Martin et al.
Main references (sources)	Physical Pharmacy by Alfred Martin et al.
Recommended books and references (scientific journals, reports...)	Theory and Practice of Physical Pharmacy by Gaurav Jain, Roop Krishen Khar, Farhan Ahmad
Electronic References, Websites	<a href="https://www.kobo.com/us/en/ebook/theory-and-practice-of-physical-pharmacy-e-book">https://www.kobo.com/us/en/ebook/theory-and-practice-of-physical-pharmacy-e-book</a>

## Course Description Form

37. Course Name:	
Pharmaceutical technology I	
38. Course Code:	
10301334	
39. Semester / Year:	
3 <sup>rd</sup> stage/1 <sup>st</sup> semester	
40. Description Preparation Date:	
20/11/2025	
41. Available Attendance Forms:	
Theory and Practical/ Attendance	
42. Number of Credit Hours (Total) / Number of Units (Total)	
45	
43. Course administrator's name (mention all, if more than one name)	
Name: As. Lec. Ali Qassim As. Lec. Mena Raeed	
44. Course Objectives	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1) Understand the fundamentals of pharmaceutical preformulation, including solubility, partitioning, powder, and compaction properties.</li> <li>2) Learn the formulation, preparation, and administration of various solution dosage forms, both oral and topical.</li> <li>3) Explore the principles and techniques involved in developing suspensions, including stability, rheology, and compounding methods.</li> <li>4) Study the formulation and delivery mechanisms of aerosols and foams, with focus on metered-dose inhalers and topical/vaginal application.</li> <li>5) Gain knowledge of parenteral dosage forms, including types of injections, sterilization methods, and production standards.</li> <li>6) Develop an understanding of storage, packaging, and labeling practices across all listed dosage forms to ensure quality and patient safety.</li> </ol>
45. Teaching and Learning Strategies	
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Theoretical lectures</li> <li>2. Blackboard</li> <li>3. Projector device</li> <li>4. PowerPoint presentation</li> <li>5. Educational laboratories</li> <li>6. Electronic lectures</li> <li>7. Scientific and practical research</li> </ol>

## 8. Office Research

## 46. Course Structure

Week	Hou rs	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	9	Pharmaceutical preformulation	The concept of preformulation Solubility Molecular dissociation Partitioning Dissolution rate Hygroscopicity Physical form Powder properties Compaction properties	PowerPoint, Problem Solving, Practicality	Formative, summative, quiz, exam
4-6	6	Solutions	Solutions and types of solutions • Some Solvents for Liquid Preparations • Preparation of solutions • Mixing oral liquids • Oral solutions and preparations for oral solution • Syrups • Elixirs • Tinctures • Proper administration and use of liquid peroral dosage forms • Topical Solutions and Tinctures • Vaginal and rectal solutions • Topical tinctures • Topical oral (dental) solutions • Miscellaneous solutions • Nonaqueous solutions • Extraction methods for preparing solutions	PowerPoint, Problem Solving, Practicality	Formative, summative, quiz, exam
7-9	4	Suspensions	• Reasons for suspension • Features of desired in a pharmaceutical suspension • Sedimentation rate of the particles of a suspension • Physical features of the dispersed phase • Dispersion medium • Rheology of suspensions • Preparation of suspensions • Sustained-release suspensions • Extemporaneous compounding of suspensions • Mixing solids in liquids • Packaging and storage of suspensions • Examples of pharmaceutical suspensions • Dry powders for oral suspension	PowerPoint, Problem Solving, Practicality	Formative, summative, quiz, exam

10-11	6	Aerosols and foams	Types of aerosols Advantages of the aerosol dosage form The aerosol principle Aerosol systems Aerosol container and valve assembly Metered-dose inhalers Filling operations Packaging, labeling, and storage Proper Administration and Use of Proper administration and use of pharmaceutical aerosols Examples of aerosols Topical aerosols Vaginal and rectal aerosols Foams: Their types and preparation	PowerPoint, Problem Solving, Practicality	Formative, summative, quiz, exam
12-15	12	Parenterals	Injections Parenteral routes of administration Official types of injections Solvents and vehicles for injections Colligative properties for injections Methods of sterilization Validation/verification of sterility The industrial preparation of parenteral products Packaging, labeling, and storage of injections Available injections (examples) Small volume parenterals Large volume parenterals Special considerations associated with parenteral therapy Irrigation and dialysis solutions	PowerPoint, Problem Solving, Practicality	Formative, summative, quiz, exam

#### 47. Course Evaluation

Quizzes, 5%  
reports, 5%  
Midterm Exam, 30%  
and Final Exam 60%

#### 48. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<b>Pharmaceutical Calculation by Stoklosa</b> <ul style="list-style-type: none"> <li>• Physical Pharmacy by Alfred Martin et al.</li> <li>• Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel; latest edition. And Sprowel's</li> </ul>
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	<p>American Pharmacy.</p> <ul style="list-style-type: none"> <li>• Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.</li> <li>• The Theory and Practice Industrial Pharmacy by Le Lachman et al.</li> </ul>
Main references (sources)	Encyclopedia of Pharmaceutical Technology
Recommended books and references (scientific journals, reports...)	<p>British Pharmacopeia</p> <p>United state pharmacopeia</p> <p>European pharmacopeia</p>
Electronic References, Websites	Slide share

## Course Description Form

<b>49. Course Name:</b>	
Pharmaceutical and Cosmetic Preparations	
<b>50. Course Code:</b>	
10301339	
<b>51. Semester / Year:</b>	
3 <sup>rd</sup> stage/ 2 <sup>nd</sup> semester	
<b>52. Description Preparation Date:</b>	
20/11/2025	
<b>53. Available Attendance Forms:</b>	
Theory and Practical/ Attendance	
<b>54. Number of Credit Hours (Total) / Number of Units (Total)</b>	
45	
<b>55. Course administrator's name (mention all, if more than one name)</b>	
Name: Lec Dr. Maher Abdulrazzaq As. Lec. Abdulla Qussay As. Lec. Mena raed	
<b>56. Course Objectives</b>	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Understand the principles, preparation, and stability of pharmaceutical emulsions, including surfactant systems and microemulsions.</li> <li>2. Study the formulation, compounding, and use of semisolid dosage forms such as ointments, creams, gels, and dermatologic preparations.</li> <li>3. Explore the design and clinical applications of suppositories, vaginal inserts, and medication sticks, including manufacturing and quality control.</li> <li>4. Learn the physicochemical and therapeutic considerations for selecting appropriate bases and packaging for topical and rectal formulations.</li> <li>5. Examine the formulation strategies and clinical uses of cosmetic products, including sunscreens, exfoliants, and anti-aging preparations.</li> <li>6. Apply knowledge of formulation science to ensure safety, effectiveness, and patient acceptability of pharmaceutical and cosmetic products.</li> </ol>
<b>57. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Theoretical lectures</li> <li>2. Blackboard</li> <li>3. Projector device</li> <li>4. PowerPoint presentation</li> <li>5. Educational laboratories</li> <li>6. Electronic lectures</li> <li>7. Scientific and practical research</li> <li>8. Office Research</li> </ol>
<b>58. Course Structure</b>	

<b>Week</b>	<b>Hou rs</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>
1-3	9	Emulsions; the purpose of emulsification;	Purpose of emulsion and emulsification Theories of emulsification Gibbs free energy in an emulsion Preparation of emulsions Emulsifying agents HLB system Blending of surfactants Surface area of globules Methods of emulsion preparation Mixing immiscible liquids Microemulsions Stability of emulsions Examples of oral emulsions Examples of topical emulsions	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
4-6	9	Ointments, creams and gels.	Ointments Ointment bases Selection of the appropriate base Compendial requirements for ointments Preparation of ointments Creams Preparation of creams Gels: preparation, packaging and storage Miscellaneous semisolid preparations: pastes, plasters, and glycerogelatins Packaging semisolid preparations Examples of ointments, creams and gels Features and uses of dermatologic preparations Features and uses of ophthalmic ointments and gels Features and uses of nasal ointments and gels	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
7-9	9	Suppositories.	Suppositories Uses and applications Some factors of drug absorption from rectal suppositories Suppository bases Formulation variables Preparation of suppositories (dose replacement calculations) Manufacturing suppositories Quality control Packaging and storage Stability Rectal suppositories (with examples) Urethral suppositories (with examples) Vaginal inserts Vaginal inserts (tablets) Medication sticks	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

			Special types of suppositories		
10	2	Pharmaceutical Incompatibilities	Physical incompatibilities, chemical incompatibilities, correction of incompatibilities	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
11-15	16	Cosmetic Formulations	Introduction Cosmetic formulation of skin care products (Chapter 1) Toners and astringents (Chapter 5) Antiperspirants (Chapter 8) Sunscreens (Chapter 9) Anti-aging skin care formulations (Chapter 11) Topical exfoliation—clinical effects and formulating considerations (Chapter 15) Herbs in cosmeceuticals (Chapter 19)	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

### 59. Course Evaluation

Quizzes, 5%  
reports, 5%  
Midterm Exam, 30%  
and Final Exam 60%

### 60. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Pharmaceutical Calculation by Stoklosa <ul style="list-style-type: none"> <li>Physical Pharmacy by Alfred Martin et al.</li> <li>Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel; latest edition. And Sprowel's American Pharmacy.</li> <li>Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.</li> <li>The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.</li> </ul>
Main references (sources)	Encyclopedia of Pharmaceutical Technology
Recommended books and references (scientific journals, reports...)	British Pharmacopeia United state pharmacopeia European pharmacopeia
Electronic References, Websites	Slide share

## Course Description Form

<b>1. Course Name:</b>	
Biopharmaceutics	
<b>2. Course Code:</b>	
10301447	
<b>3. Semester / Year:</b>	
4 <sup>rd</sup> stage/ 1 <sup>nd</sup> semester	
<b>4. Description Preparation Date:</b>	
20/11/2025	
<b>5. Available Attendance Forms:</b>	
Theory and Practical/ Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
32	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: As. Lec. Rawaa Mohammed As. Lec. Ali Raad	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Understanding the concept of biopharmaceutics and its aspects.</li> <li>• Understanding the concept of pharmacokinetics, both linear and nonlinear.</li> <li>• Understanding the concept of the one-compartment model and the multi-compartment model.</li> <li>• Understanding the concept of dosage forms and multiple dosage regimens.</li> <li>• Understanding the concept of bioavailability and bioequivalence.</li> </ul> <p>Understanding the concept of drug absorption and protein binding.</p>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Theoretical lectures</li> <li>2. Blackboard</li> <li>3. Projector device</li> <li>4. PowerPoint presentation</li> <li>5. Educational laboratories</li> </ol>

- 6. Electronic lectures
- 7. Scientific and practical research
- 8. Office Research

### 10. Course Structure

Week	Hou rs	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week1-4	10	Introduction to Biopharmaceutics	Introduction to Biopharmaceutics	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Week4-5	5	Mechanisms of Absorption  Physicochemical Factors  Dissolution Rate  Effects of Excipients  Types of Dosage Forms	Biopharmaceutical Aspects of Drug Products  Mechanisms of Absorption  Physicochemical Factors  Dissolution Rate  Effects of Excipients  Types of Dosage Forms	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Week-6-7	6	One-Compartment Open Model and Multi-Compartment Models	One-Compartment Open Model and Multi-Compartment Models	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Week8-11	10	Powdered dosage forms.	Powdered dosage forms.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Week11-14	10	Semisolid dosage forms.	Semisolid dosage forms.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
Week15-16	4	Drug Absorption Kinetics, Bioavailability, and Bioequivalence	Drug Absorption Kinetics, Bioavailability, and Bioequivalence	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

		Drug Elimination from Biological Systems: Hepatic Drug Elimination and Drug-Protein Binding	Drug Elimination from Biological Systems: Hepatic Drug Elimination and Drug-Protein Binding	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
		Intravenous Injection, Multiple Dosing Regimens, Nonlinear Pharmacokinetics, and Dose Adjustment in Renal Disease	Intravenous Injection, Multiple Dosing Regimens, Nonlinear Pharmacokinetics, and Dose Adjustment in Renal Disease	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

### 11. Course Evaluation

Quizzes, 5%  
 reports, 5%  
 Midterm Exam, 30%  
 and Final Exam 60%

### 12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Pharmaceutical Calculation by Stoklosa <ul style="list-style-type: none"> <li>• Physical Pharmacy by Alfred Martin et al.</li> <li>• Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel; latest edition. And Sprowel's American Pharmacy.</li> <li>• Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.</li> <li>• The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.</li> </ul>
Recommended books and references (scientific journals, reports...)	British Pharmacopeia United state pharmacopeia European pharmacopeia
Electronic References, Websites	Slide share

## Course Description Form

<b>13. Course Name:</b>					
Industrial pharmacy I					
<b>14. Course Code:</b>					
10301447					
<b>15. Semester / Year:</b>					
4 <sup>th</sup> years/ 2 <sup>nd</sup> semester					
<b>16. Description Preparation Date:</b>					
20/11/2025					
<b>17. Available Attendance Forms:</b>					
Theory and Practical/ Attendance					
<b>18. Number of Credit Hours (Total) / Number of Units (Total)</b>					
45					
<b>19. Course administrator's name (mention all, if more than one name)</b>					
Name: Lec. Dr.Maher Abdulrazzaq Luqman As. Lec. Abdula Qusay As. Lec. Rawaa Mohammed					
<b>20. Course Objectives</b>					
<b>Course Objectives</b>		Industrial pharmacy's mission where the students to study the equipment used in pharmaceutical manufacturing facilities, including mixing, packaging, and mixing.			
<b>21. Teaching and Learning Strategies</b>					
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Theoretical lectures</li> <li>2. Blackboard</li> <li>3. Projector device</li> <li>4. PowerPoint presentation</li> <li>5. Educational laboratories</li> <li>6. Electronic lectures</li> <li>7. Scientific and practical research</li> <li>8. Office Research</li> </ol>				
<b>22. Course Structure</b>					
<b>Week</b>	<b>Hours</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>
Week 1-2	7	The principles of	The principles of pharmaceutical processing; mixing; fluid mixing; flow	PowerPoint, Problem	Formative, summative, quiz, exam

		pharmaceutical processing	characteristics; mechanisms of mixing; mixing equipment; batch and continuous mixing; mixer selection; solid mixing theory and particulate solid variables; forces and mechanisms	Solving, Practicalitie	
Week 3-4	7	pharmaceutical application; size measurement methods	Milling; pharmaceutical application; size measurement methods; theory and energy of comminution; types of mills; factors influencing milling; selection of mill techniques; specialized drying methods	PowerPoint ,Problem Solving, Practicalitie	Formative, summative, quiz, exam
Week 5-6	7	Drying: definition; purpose; humidity measurement	Drying: definition; purpose; humidity measurement; theory of drying; drying of solids, and classification of dryer; specialized drying methods.	PowerPoint ,Problem Solving, Practicalitie	Formative, summative, quiz, exam
Week 7-8	7	Understand filtration principles	Clarification and filtration: Theory; filter media; filter aids; selection of drying method; non-sterile and sterile operations; integrity testing; equipment and systems (commercial and laboratory).	PowerPoint ,Problem Solving, Practicalitie	Formative, summative, quiz, exam
Week 9-10	7	Understand sterilization principles	Sterilization; validation of methods; microbial death kinetics; methods of sterilization (thermal and non-thermal); mechanisms; evaluation.	PowerPoint, Problem Solving, Practicalitie	Formative, summative, quiz, exam
Week 11	3	Understand dosage design	Pharmaceutical dosage form design; pre-formulation; preliminary evaluation; bulk characterization; solubility and stability analysis.	PowerPoint ,Problem Solving, Practicalitie	Formative, summative, quiz, exam
Week 12-13	7	Understand sterile formulations	Pharmaceutical dosage forms; sterile products; development; formulation; production; processing; quality control.	PowerPoint , Problem Solving, Practicalitie	Formative, summative, quiz, exam

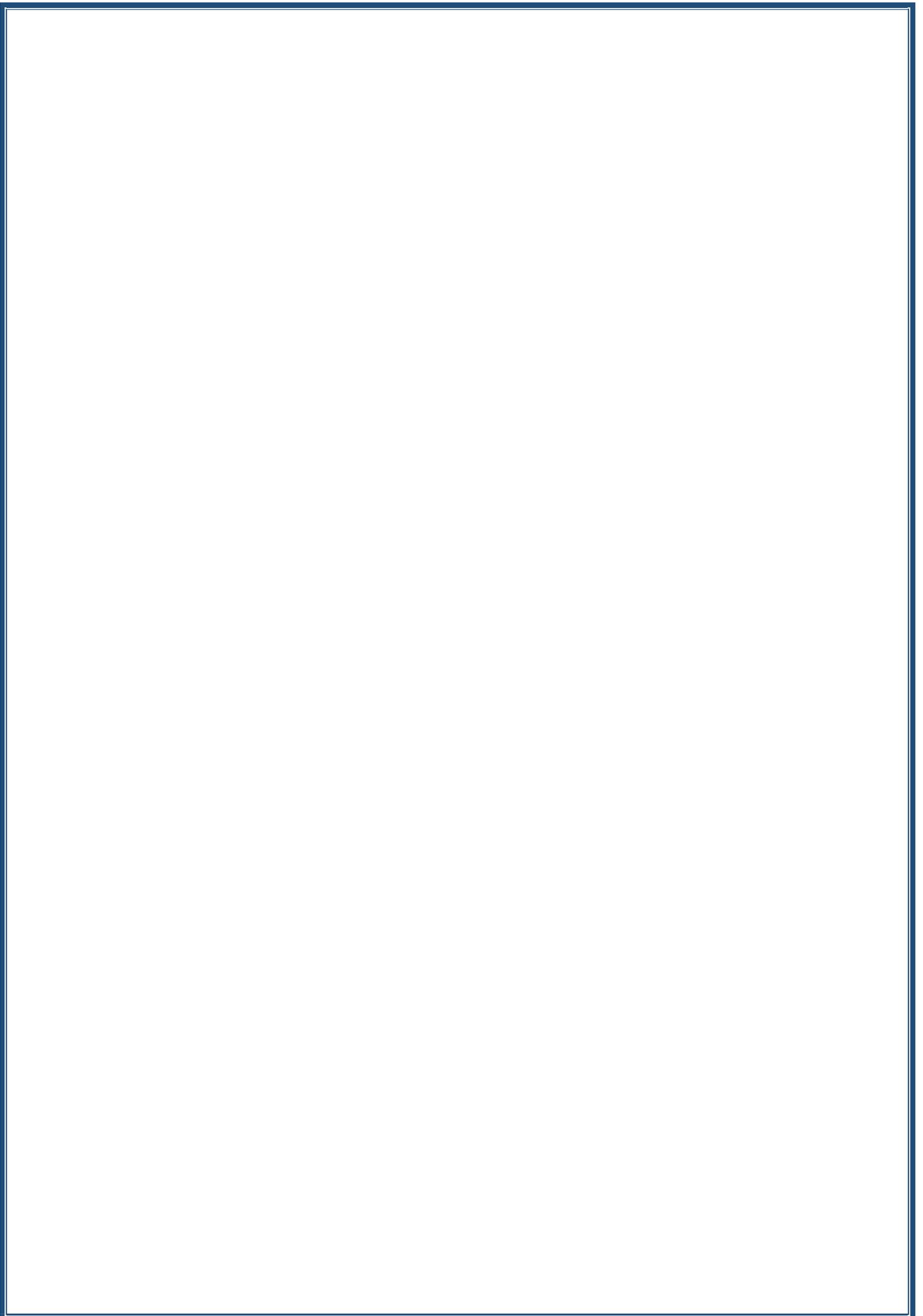
### 23. Course Evaluation

Quizzes, 5%  
reports, 5%  
Midterm Exam, 30%

and Final Exam 60%

## 24. Learning and Teaching Resources

Required textbooks	<ul style="list-style-type: none"><li>• Pharmaceutical Calculation by Stoklosa</li><li>• Physical Pharmacy by Alfred Martin et al.</li><li>• Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel; latest edition. And Sprowel's American Pharmacy.</li><li>• Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.</li><li>• The Theory and Practice of Industrial Pharmacy Leon Lachman et al.</li></ul>
Main references (sources)	Encyclopedia of Pharmaceutical Technology
Recommended books and references (scientific journals, reports...)	British Pharmacopeia United state pharmacopeia European pharmacopia
Electronic References, Websites	Slide share



## Course Description Form

25. Course Name:	Industrial Pharmacy II		
26. Course Code:	10301557		
27. Semester / Year:	1 <sup>st</sup> semester/5 <sup>th</sup> year		
28. Description Preparation Date:	20/11/2025		
29. Available Attendance Forms:	Theory and Practical/ Attendance		
30. Number of Credit Hours (Total) / Number of Units (Total)	45		
31. Course administrator's name (mention all, if more than one name)	Name: As. Prof. Yasir Qasim Mohammed Dr. Lec. Maher Abdulrazzaq Luqman		
32. Course Objectives	<table border="1"><tr><td><b>Course Objectives</b></td><td><ul style="list-style-type: none"><li>• Provide students with a foundational knowledge of pharmaceutical manufacturing processes.</li><li>• Introduce principles of Good Manufacturing Practice (GMP) and regulatory requirements.</li><li>• Develop an understanding of formulation design and optimization of various dosage forms.</li><li>• Familiarize students with equipment and technologies used in industrial-scale production.</li><li>• Explain quality control and quality assurance processes in pharmaceutical industries.</li><li>• Enhance practical skills related to scale-up, validation, and documentation.</li><li>• Encourage awareness of industrial safety, environmental controls, and ethical practices.</li><li>• Promote critical thinking in problem-solving related to manufacturing challenges.</li></ul></td></tr></table>	<b>Course Objectives</b>	<ul style="list-style-type: none"><li>• Provide students with a foundational knowledge of pharmaceutical manufacturing processes.</li><li>• Introduce principles of Good Manufacturing Practice (GMP) and regulatory requirements.</li><li>• Develop an understanding of formulation design and optimization of various dosage forms.</li><li>• Familiarize students with equipment and technologies used in industrial-scale production.</li><li>• Explain quality control and quality assurance processes in pharmaceutical industries.</li><li>• Enhance practical skills related to scale-up, validation, and documentation.</li><li>• Encourage awareness of industrial safety, environmental controls, and ethical practices.</li><li>• Promote critical thinking in problem-solving related to manufacturing challenges.</li></ul>
<b>Course Objectives</b>	<ul style="list-style-type: none"><li>• Provide students with a foundational knowledge of pharmaceutical manufacturing processes.</li><li>• Introduce principles of Good Manufacturing Practice (GMP) and regulatory requirements.</li><li>• Develop an understanding of formulation design and optimization of various dosage forms.</li><li>• Familiarize students with equipment and technologies used in industrial-scale production.</li><li>• Explain quality control and quality assurance processes in pharmaceutical industries.</li><li>• Enhance practical skills related to scale-up, validation, and documentation.</li><li>• Encourage awareness of industrial safety, environmental controls, and ethical practices.</li><li>• Promote critical thinking in problem-solving related to manufacturing challenges.</li></ul>		
33. Teaching and Learning Strategies			

<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Theoretical lectures</li> <li>2. Blackboard</li> <li>3. Projector device</li> <li>4. PowerPoint presentation</li> <li>5. Educational laboratories</li> <li>6. Electronic lectures</li> <li>7. Scientific and practical research</li> <li>8. Office Research</li> </ol>
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#### 34. Course Structure

<b>Week</b>	<b>Hours</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>
1	10	Understand tablet formulation	Pharmaceutical dosage forms: Tablets; role in therapy; advantages and disadvantages; formulation; properties; evaluation; machines used in tableting; quality control; problems; granulation, and methods of production; excipients, and types of tablets	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
2	4	Understand coating principles	Tablet coating; principles; properties; equipment; processing; types of coating (sugar and film); quality control, and problems.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
3	3	Understand capsule formulation	Capsules: Hard gelatin capsules; materials; production; filling equipment; formulation; special techniques.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
4	2	Understand softgel composition	Soft gelatin capsules: Manufacturing methods; nature of capsule shell and content; processing and control; stability	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

5	2	Understand microencapsulation principles	Micro-encapsulation; core and coating materials; stability; equipment and Methodology.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
6	3	Understand sustained release concepts	Modified (sustained release) dosage forms; theory and concepts; evaluation and testing; formulation.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
7-7	3	Formulate pharmaceutical liquids	Liquids: Formulation; stability and equipment.	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
8-9	3	Understand suspension principles	Suspensions: Theory; formulation and evaluation	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
11-12	3	Understand emulsion systems	Emulsions: Theory and application; types; formulation; equipment and quality control	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam
13-14	3	Understand percutaneous absorption and semisolid	Semisolids: Percutaneous absorption; formulation; types of bases (vehicles)	PowerPoint, Problem Solving, Practicalities	Formative, summative, quiz, exam

### 35. Course Evaluation

Quizzes, 5%  
reports, 5%  
Midterm Exam, 30%  
and Final Exam 60%

### 36. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- Pharmaceutical Calculation by Stoklosa
- Physical Pharmacy by Alfred Martin et al.
- Pharmaceutical Dosage Forms and Drug Delivery Systems By Haward A. Ansel; latest edition. And Sprowel's American Pharmacy.
- Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.
- The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.

Main references (sources)

Encyclopedia of Pharmaceutical Technology

Recommended books and references (scientific journals, reports...)	British Pharmacopeia United state pharmacopeia European pharmacopia
Electronic References, Websites	Slide share

## Course Description Form

<b>37. Course Name:</b>					
Drug delivery system design					
<b>38. Course Code:</b>					
10301568					
<b>39. Semester / Year:</b>					
2 <sup>nd</sup> semester/5 <sup>th</sup> year					
<b>40. Description Preparation Date:</b>					
20/11/2025					
<b>41. Available Attendance Forms:</b>					
Theory and Practical/ Attendance					
<b>42. Number of Credit Hours (Total) / Number of Units (Total)</b>					
30					
<b>43. Course administrator's name (mention all, if more than one name)</b>					
Name: As. Prof. Ameera abdullellah As. Lec. Rawaa Mohammed As. Lec Ali Raed					
<b>44. Course Objectives</b>					
<b>Course Objectives</b>		<p>1.Explain the process of new drug development, including drug discovery, preclinical evaluation, early formulation studies, and regulatory submission of INDs, NDAs, and ICH guidelines.</p> <p>2.Explore the principles and applications of pharmaceutical nanotechnology, including the design and use of liposomes, dendrimers, micelles, solid nanoparticles, and lipid-based delivery systems in modern therapeutics.</p> <p>3.Describe the anatomical and physiological considerations for non-oral routes of drug delivery, including nasal, ocular, transdermal, and pulmonary routes.</p> <p>4.Analyze formulation challenges and strategies for improving drug solubility, permeability, bioavailability, and patient adherence across various advanced delivery systems.</p> <p>5.Evaluate the design, function, and clinical considerations of innovative delivery platforms such as patches, inhalers, eye drops, and nanoparticle-based systems.</p>			
<b>45. Teaching and Learning Strategies</b>					
<b>Strategy</b>		PowerPoint Presentation, Tutorials (Pen and Whiteboard), Problem Solving			
<b>46. Course Structure</b>					
<b>Week</b>	<b>Hours</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>

1-3	6	New Drug Development and Approval Process	Introduction, Drug discovery and drug design, Biologic characterization, Early formulation studies, The investigational new drug application, The new drug application, supplemental, abbreviated, and other applications, international conference on Harmonization of technical Requirements for registration of pharmaceuticals for Human use.	Powerpoint, Problem-solving	Formative, summative, quiz
4-7	7	Pharmaceutical Nanotechnology and Nanomedicines	Introduction, Applications of pharmaceutical nanotechnology, Polymer-drug conjugates, Dendrimers, Micelle systems, Solid nanoparticles, Liposomes, bilayer vesicles and lipid nanoparticles, Microcapsules and microspheres, Ongoing developments.	Powerpoint, Problem-solving	Formative, summative, quiz
<b>Mid-Term exam</b>					
7-9	4	Nasal Drug Delivery	Introduction, Anatomy and physiology, Drug delivery, Nasal delivery systems	Powerpoint, Problem-solving	Formative, summative, quiz
9-11	5	Ocular Drug Delivery	Introduction, Anatomy and physiology of the eye, Some common ocular conditions and pharmacological interventions, Topical ophthalmic preparations, Formulating ophthalmic preparations, Topical, liquid ophthalmic preparations, Barriers to topical ocular drug absorption, Increasing drug solubility and absorption in topical ophthalmic preparations, Sterility of ophthalmic preparations, Ocular drug pharmacokinetics. Targeting the posterior segment of the eye. Problems with traditional and new ocular drug delivery systems, Patient adherence and instillation of eye drops.	Powerpoint, Problem-solving	Formative, summative, quiz

12-13	4	Transdermals and Transdermal Drug Delivery Systems	Introduction, Factors affecting percutaneous absorption, Percutaneous absorption enhancers, Percutaneous absorption models, Design features of transdermal drug delivery systems, Advantages and disadvantages of TDDSs, Examples of transdermal drug delivery systems, General clinical considerations in the use of transdermals and TDDSs, Patches (not systems), Tapes, Examples of transdermal preparations.	Powerpoint, Problem-solving	Formative, summative, quiz
14-15	4	Pulmonary Drug Delivery	Inhaled drug delivery, Formulating and delivering therapeutic inhalation aerosols, Methods of aerosol size analysis.	Powerpoint, Problem-solving	Formative, summative, quiz

**Final-term exam**

47.

Quizzes 5%  
 Reports 5%  
 Midterm Exam 20%  
 Final-term Exam 70%

**48. Learning and Teaching Resources**

Required textbooks (curricular books, if any)	1- Pharmaceutical Dosage Forms and Drug Delivery Systems by Haward A. Ansel. Latest Edition.
Main references (sources)	1- Pharmaceutical Dosage Forms and Drug Delivery Systems by Haward A. Ansel. Latest Edition. 2- Handbook of pharmaceutical excipients, Raymond C Rowe et al, Latest edition.
Recommended books and references (scientific journals, reports...)	1-Applied Biopharmaceutics & Pharmacokinetics, by Leon Shargel et al, seventh edition. 2- British Pharmacopeia, latest edition.
Electronic References, Websites	1- <a href="https://www.fda.gov/industry/structured-product-labeling-resources/dosage-forms">https://www.fda.gov/industry/structured-product-labeling-resources/dosage-forms</a> .

## Course Description Form

<b>1. Course Name:</b>	
Pharmaceutical biotechnology	
<b>2. Course Code:</b>	
10301569	
<b>3. Semester / Year:</b>	
2 <sup>nd</sup> semester/5 <sup>th</sup> year	
<b>4. Description Preparation Date:</b>	
20/11/2025	
<b>5. Available Attendance Forms:</b>	
Theory/ attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
15	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: As. lec. Dr. Meena Raeed As. Lec . Ali Raeed As. Lec Ali Qassim	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<p>1-Introduce the Concept of Biotechnology in Pharmacy help students understand what biotechnology means. Show how it's used to make medicines from living cells (like insulin and vaccines).</p> <p>2-Learn How Biotech Medicines Are Made teach the basic steps of how biotech drugs are produced. explain the role of microbes, enzymes, and cells in creating these medicines.</p> <p>3-Understand Drug Delivery Systems</p> <p>4-Know the Importance of Safety and Quality teach why we need to check the safety, purity, and strength of biotech drugs.</p> <p>5-Explore Real-Life Applications Show examples of biotech in real medicine: insulin for diabetes, vaccines, cancer treatments. help students see how biotechnology improves health and saves lives</p>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	Power Point Presentation, Tutorials (Pen and Whiteboard), Problem Solving
<b>10. Course Structure</b>	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1		Formulation of biotechnology products Microbiological considerations	Power point, Problem solving	Formative, summative, Quiz
2	1		Formulation of biotechnology products Microbiological considerations	Power point, Problem solving	Formative, summative, quiz
3	1		Formulation of biotechnology products Microbiological considerations	Power point, Problem solving	Formative, summative, quiz
4	1		Compound found in parenteral formulation of biotech. products	Power point, Problem solving	Formative, summative, quiz
5	1		Compound found in parenteral formulation of biotech. products	Power point, Problem solving	Formative, summative, quiz
6	1		Compound found in parenteral formulation of biotech. products	Power point, Problem solving	Formative, summative, quiz
7	1		Delivery of protein; routes of administration and absorption enhancement pharmaceuticals; preservatives; sterilization; preservatives selection	Power point, Problem solving	Formative, summative, quiz
Mid-Term exam					
9	1		Delivery of protein; routes of administration and absorption enhancement pharmaceuticals; preservatives; sterilization; preservatives selection.	Power point, Problem solving	Formative, summative, quiz

10	1		Pharmacokinetics and pharmacodynamics of peptide and protein drugs, Elimination of protein drugs	Power point, Problem solving	Formative, summative, quiz
11	1		Pharmacokinetics and pharmacodynamics of peptide and protein drugs, Elimination of protein drugs	Power point, Problem solving	Formative, summative, quiz
12	1		Pharmacokinetics and pharmacodynamics of peptide and protein drugs, Elimination of protein drugs	Power point, Problem solving	Formative, summative, quiz
13	1		Pharmacokinetics and pharmacodynamics of peptide and protein drugs, Elimination of protein drugs	Power point, Problem solving	Formative, summative, quiz
14	1		Pharmacokinetics and pharmacodynamics of peptide and protein drugs, Elimination of protein drugs	Power point, Problem solving	Formative, summative, quiz
15			Final-term exam		

## 11.

Mid term Exam 30%

Final-term Exam 70%

## 12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ul style="list-style-type: none"> <li>1-Sprowls' American Pharmacy: An Introduction to Pharmaceutical Techniques and Dosage Forms</li> <li>2-Martin's Physical Pharmacy and Pharmaceutical Sciences</li> <li>3-Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems</li> <li>4-Applied biopharmaceutics and pharmacokinetics by Leon Shargel</li> <li>The Theory and Practice of Industrial Pharmacy Herbert Lieberman and Leon Lachman.</li> </ul>
Main references (sources)	<ul style="list-style-type: none"> <li>1-Encyclopedia of Pharmaceutical Technology</li> <li>2-Physicochemical Principles of Pharmacy by Alexander T. Florence</li> <li>3-Aulton's Pharmaceutics : The Design and Manufacture of Medicines.</li> </ul>

Recommended books and references (scientific journals, reports...)	1-British pharmacopoeia 2-United State Pharmacopoeia 3-European Pharmacopeia
Electronic References, Websites	1- <a href="https://www.ncbi.nlm.nih.gov">https://www.ncbi.nlm.nih.gov</a> 2- <a href="https://www.sciencedirect.com">https://www.sciencedirect.com</a>