

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



# **Academic Program and Course Description Guide**

**2024**

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## **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 staP 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), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

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

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## **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.

## Academic Program Description Form

**University Name: Tikrit University**

**Faculty/Institute: College of Pharmacy**

**Scientific Department: Pharmaceutics Department**

**Academic or Professional Program Name: Bachelor in Pharmacy Sciences**

**Final Certificate Name: Bachelor in Pharmacy Sciences**

**Academic System: Semester system (Two semesters/year)**

**Description Preparation Date: 01/03/2024**

**File Completion Date: 28/03/2024**



**Signature:**

**Head of Department Name:**

**Lect. Dr. Ahmed yousif fadhel**

**Date: 25/03/2024**

**The file is checked by:**

**Department of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Department:**

**Nashwan Ahmed Sumait**



**Signature:**

**Scientific Associate Name:**

**Lect. Dr. Ali Hussein Abbas**

**Date: 25/03/2024**



**Signature**

**Approval of the Dean**

**Lect. Dr. Ali Hussein Abbas**

<p><b>1. Program Vision</b></p> <p>Pharmaceutics is a branch of the main branches of the Faculty of Pharmacy, which is part of the educational process in the college system, which is deals with the formal process that should be taken in order to transformation a new chemical entity compounds into a medication to be used safely and effectively by patients. It is also called the science of dosage form design. There are many chemicals with pharmacological properties, but they need special measures to help them achieve therapeutically relevant amounts at their sites of action. Pharmaceutics helps relate the formulation of drugs to their delivery and disposition in the body.</p> <p>Pharmaceutics deals with the formulation of a pure drug substance into a dosage form.</p>
<p><b>2. Program Mission</b></p> <p>The mission of the Department of Pharmaceutics and Industrial Pharmacy of knowledge essential to the Pharmaceutical practice. While providing one of the most dynamic programs in the area of drug discovery and development, the faculty introduces and develops skills of critical thinking, problem-solving, and life-long learning in future pharmacists and prepares students to perform a variety of specialized tasks including pre-formulation evaluation, dosage form design, stability testing ,pilot plant scale –up and production.</p>
<p><b>3. Program Objectives</b></p> <p>1- Teaching the students the fundamentals of Pharmaceutics principles and calculations  2- Teaching the students the physico-chemical properties of the drug and excipients used in the dosage form formulation.  3-Teaching the student's basic technology for compounding different pharmaceutical preparation  4-Teaching the students the bio-pharmaceutics and pharmacokinetics of the drug in the body.  5-Teaching the students the manufacturing process of different dosage forms and methods of their evaluations.  6-Teaching the student the principle of dosage form design.  7-Teaching the student the principles of pharmaceutical biotechnology, biopharmaceutical product formulation, and their routes of administration.  8-Teaching the student the fundamentals of training in pharmacy and how to dispense the prescriptions.  9- Supervise the graduation projects.</p>
<p><b>4. Program Accreditation</b></p> <p>None currently available</p>

5. Other external influences

None currently available

6 Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews•
Institution Requirements	10			<b>Basic Course</b>
College Requirements				<b>Basic Course</b>
Department Requirements				<b>Basic Course</b>
Summer Training				
Other				

## 7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
1 <sup>st</sup> 1 <sup>st</sup> semester	Principles of pharmacy practices	112	2	
1 <sup>st</sup> 2 <sup>nd</sup> semester	Pharmaceutical calculation	128	2	2
2 <sup>nd</sup> 1 <sup>st</sup> semester	Physical pharmacy I	213	3	2
2 <sup>nd</sup> 2 <sup>nd</sup> semester	Physical pharmacy II	228	3	2
3 <sup>rd</sup> 1 <sup>st</sup> semester	Pharmaceutical technology I	313	3	2
3 <sup>rd</sup> 2 <sup>nd</sup> semester	Pharmaceutical Technology II	328	3	2
4 <sup>th</sup> 1 <sup>st</sup> semester	Biopharmaceutics	414	2	2
4 <sup>th</sup> 2 <sup>nd</sup> semester	Industrial pharmacy I	4210	3	2
5 <sup>th</sup> 1 <sup>st</sup> semester	Industrial Pharmacy II	512	3	2
5 <sup>th</sup> 2 <sup>nd</sup> semester	Dosage form design	5212	2	
5 <sup>th</sup> 2 <sup>nd</sup> semester	Pharmaceutical biotechnology	516	1	

## 8. Expected learning outcomes of the program

A1. Students can acquire knowledge, understanding, principles, theories and basics in pharmaceutics and the pharmaceutical industry.

A2. Students can understand advanced modern scientific topics in the field of pharmaceutics

A3. It enables students to understand the methods of chemical analysis and diagnosis of drug composition in pharmacy practice, methods of examination and diagnosis of physicochemical properties of pharmaceutical forms and its compositions.

A4. To see the most important computer software that is used in the field of drug analysis and design and the foundations of its theoretical applications.

A5. To be able to understand the basics of the work of laboratory devices that are used in drug analysis and diagnosis and the Skills



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B1. Describe and analyze the applications of pharmacies and the pharmaceutical industry.

B2. Able to write and discuss methods of analysis and examination of pharmaceutical forms and formulations.

B3. Able to analyze and discuss problems and find successful solutions to them.

B4. Justify, communicate, and discuss concepts, especially those related to pharmaceuticals in the field of pharmaceutical sciences.

B5. Through the branch laboratories, the student can install the required pharmaceutical forms, conduct the necessary tests and analyzes, and study their stability

C1- Developing the student's ability to discuss

C2- Actual application with existing capabilities

C3- Developing the student's ability to benefit from the available means

C4- Developing the student's ability to perform daily duties

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## 9. Teaching and Learning Strategies

- 1- Theoretical lectures within the course.
- 2- Scientific discussions lectures (researchers and postgraduate students).
- 3- Small group discussion method.
- 4- Practical lectures in the laboratories of pharmacies and the pharmaceutical industry.
- 5- Seminars (scientific seminars) and presentation of the latest scientific developments within the specialism by students.
- 6- Graduation research projects for fifth stage students.
- 7- Scientific trips to actual work sites and laboratories in hospitals and health departments, and to see the most important problems and applications in the field of pharmacies and the pharmaceutical industry within the reality of actual work

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## 10. Evaluation methods

Theoretical and practical exams in addition to classroom and extracurricular activities and holding scientific seminars

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

<b>11. Faculty</b>					
<b>Faculty Members</b>					
Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
<b>Lecturer</b>	3			3	
<b>Assistant Lecturer</b>	3			3	
<b>Professional Development</b>					
Mentoring new faculty members					
<ul style="list-style-type: none"> <li>- Directing teachers to organize seminars, courses, and give scientific lectures periodically.</li> <li>- Directing teachers to publish scientific research in their field of specialization in reputable journals</li> <li>- Directing teachers to participate in local and international scientific conferences</li> </ul>					
Professional development of faculty members					
<ul style="list-style-type: none"> <li>- Participation in academic courses concerned with various fields of education</li> <li>- Participation in curriculum development.</li> <li>- Active participation in scientific conferences</li> <li>- Motivating the teacher to use various teaching methods for students.development, etc.</li> </ul>					
<b>12. Acceptance Criterion</b>					
Admission is made within the central admission criteria of the Ministry of Higher Education and Scientific Research					
<b>13. The most important sources of information about the program</b>					
The college website, the college guide, the university website, the college page on social media sites, in addition to professional institutions (the Iraqi Pharmacists Syndicate) and the Ministry of Higher Education and Scientific Research					

14. Program Development Plan

- Updating and developing curricula according to the requirements of the labor market
- Successfully use contemporary technology applications and master conducting experiments
- Providing volunteer activities
- Directing students' research towards applied projects that address societal problems

## Curriculum Skills Map

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

				Program Learning Outcomes															
Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
1 <sup>st</sup>	112	Principle of Pharmacy	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	128	Pharmaceutical Calculation	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2 <sup>nd</sup>	CO213	Physical Pharmacy I	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	CO228	Physical pharmacy II	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
3 <sup>rd</sup>	313	Pharmaceutical Technology I	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	328	Pharmaceutical Technology II	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
4 <sup>th</sup>	414	Biopharmaceutics	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	4210	Industrial Pharmacy I	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
5 <sup>th</sup>	512	Industrial Pharmacy II		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	5212	Dosage form design	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	516	Pharmaceutical Biotechnology	C	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	

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

## Course Description Form

1. Course Name:	
<b>Principles of pharmacy practices</b>	
2. Course Code:	
<b>112</b>	
3. Semester / Year:	
<b>1<sup>st</sup> semester / 1<sup>st</sup> year</b>	
4. Description Preparation Date:	
<b>01/03/2024</b>	
5. Available Attendance Forms:	
<b>Theoretical lectures in classroom.</b>	
6. Number of Credit Hours (Total) / Number of Units (Total)	
<b>Two Credit theory hours/week– Two units</b>	
7. Course administrator's name (mention all, if more than one name)	
Ahmed abdalla essa	
8. Course Objectives	
<b>Course Objectives:</b> Enable the students to interpretation of prescription or medication order, to use the metric and apothecaries system in pharmaceutical calculations to calculate the dose, to use some of fundamental of measurements and calculations and to use calculations related density, specific gravity and specific volume.	
9. Teaching and Learning Strategies	
<b>Strategy</b>	- Theoretical lectures - Daily assignments and discussions
10. Course Structure	

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation Method
1st	2	Fundamentals of pharmaceutical calculation	Common and Decimal Fractions, Percent Ratio,	white board, handout	Discussions

			Proportion and practice problems.		
2 <sup>nd</sup>	2	Interpenetration of prescription and medical orders	Objectives, Hospital and Other Institutional Medication Order Forms and Use of Roman Numerals on Prescriptions	white board, handout	Discussions
3 <sup>rd</sup>	2	Interpenetration of prescription and medical orders	Use of Abbreviations and Symbols, Practice problems.	Smart board, white board, handout	Discussions
4 <sup>th</sup>	2	International system of units	Objectives. Guidelines for the Correct Use of the SI, Measure of Volume, Measure of Weight	Smart board, white board, handout	
5 <sup>th</sup>	2	International system of units	Fundamental Computations, Practice Problems	Smart board, white board, handout	Discussions
					Mid-term Exam
6 <sup>th</sup>	2	Common system of measurement and intersystem conversion	Apothecaries' Fluid Measure, Apothecaries' Measure of Weight, Avoirdupois Measure	Smart board, white board, handout	Discussions
7 <sup>th</sup>	2	Common system of measurement and intersystem	Intersystem Conversion, Conversion of Liquid Quantities, Conversion of	white board, handout	Discussions

		conversion	Weights ,Practice Problems		
8 <sup>th</sup>	2	Calculation of doses: General consideration	Objectives, Dose Definitions Dose Measurement. General Dose Calculations.	white board, handout	Discussions
9 <sup>th</sup>	2	Calculation of doses: General consideration	General Dose Calculations. Practice Problems	Smart board, white board, handout	Discussions
10 <sup>th</sup>	2	Calculation of doses: Patient parameters	Objectives. Pediatric Patients Geriatric Patients Drug Dosage Based on Age.	Smart board, white board, handout	Discussions
11 <sup>th</sup>	2	Calculation of doses: Patient parameters	Drug Dosage Based on Body Weigh, Drug Dosage Based on Body Surface Area, Practice Problems.	Smart board, white board, handout	Discussions
12 <sup>th</sup>	2	Density, Specific Gravity, and Specific Volume	Objectives, Density. Specific Gravity Density Versus Specific Gravity, Calculating the Specific Gravity of Liquids.	Smart board, white board, handout	Discussions
13 <sup>th</sup>	2	Density, Specific Gravity, and Specific Volume	Use of Specific Gravity in Calculations of Weight and Volume, Calculating Specific Volume, Practice Problems	Smart board, white board, handout	Discussions
14 <sup>th</sup>	2	Reducing and enlarging	Objectives, Formulas That	Smart board, white board,	Discussions

		formulas	Specify Proportional Parts	handout	
15 <sup>th</sup>	2	Reducing and enlarging formulas	Practice Problems	Practice Problems	Discussions

### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports ..... etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- 1- Pharmaceutical Calculation, Howard C Ansel, 13th Edition 2010, Wolters Kluwer Lippincott Williams & Wilkins
- 2- Martin 's physical pharmacy and pharmaceutical sciences, Patrick J. Sinko. Wolters Kluwer., Lippincott Williams & Wilkins. Philadelphia. 2011.
- 3- Lab manual for physical pharmacy adopted by the department of Pharmaceutics.
- 4- Lewis W. Dittert, "American pharmacy", Lippincott. Company, 1974.
- 5- Ansel's Pharmaceutical dosage forms and drug delivery systems 9th edition by Howard C. Ansel. Sinko .Wolters Kluwer, Lippincott Williams & Wilkins. Philadelphia. 2011.
- 6- Lab manual for pharmaceutical technology by the department of pharmaceutics
- 7- Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Third edition, Michael E. Aulton (Author). Churchill, Livingstone- Elsevier.
- 8- Shargel L., Yu AB., (Eds). Applied Biopharmaceutics and Pharmacokinetics, Fifth edition, International Edition 2005
- 9- Lab manual for biopharmaceutics
- 10- Theory and practice in industrial pharmacy by Lachmann (2009).
- 11- Pharmaceutical biotechnology by J.A. Crommelin, Robert D. Syinder.
- 12- Pharmaceutical biotechnology Fundamentals and



	Applications
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

## Course Description Form

1. Course Name:

**Pharmaceutical calculation**

2. Course Code:

**128**

3. Semester / Year:

**2<sup>nd</sup> semester / 1<sup>st</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Two Credit theory hours/week– Two units**

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

Name: assit lec. Ahmed abdalla essa

8. Course Objectives

**Course Objectives:** The use of calculations in pharmacy is varied and broad-based. It encompasses calculations performed by pharmacists in traditional as well as in specialized practice settings and within operational and research areas in industry, academia, and government.

The scope of pharmaceutical calculations includes computations related to: Chemical and physical properties of drug substances and pharmaceutical ingredient; biological activity and rates of drug absorption, bodily distribution, metabolism and excretion; statistical data from basic research and clinical drug studies; pharmaceutical product development and formulation; prescriptions and medication orders including drug dosage, dosage regimens, and patient compliance; pharmacoeconomics; and other areas.

9. Teaching and Learning Strategies

<b>Strategy</b>	<ul style="list-style-type: none"> <li>- Theoretical lectures</li> <li>- Daily assignments and discussions</li> </ul>
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10. Course Structure:					
Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	2	Isotonic and buffer solutions	Differentiate between the terms isosmotic, isotonic, hypertonic and hypotonic.	Smart board, white board, handout	Discussions
2nd	2	Isotonic and buffer solutions	Apply physical chemical principles in the calculation of isotonic solutions.	Smart board, white board, handout	Discussions
3rd	2	Isotonic and buffer solutions	Perform the calculations required to prepare isotonic component prescription.	Smart board, white board, handout	Discussions
4th	2	Electrolyte solutions: Milliequivalent s, millimoles, and milliosmoles	Calculate the milliequivalent weight from an atomic or formula weight.	Smart board, white board, handout	
5th	2	Electrolyte solutions: Milliequivalent s, millimoles, and milliosmoles	Convert between milligrams and milliequivalents.	Smart board, white board, handout	Discussions
					Mid-term Exam

6th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Calculate problems involving milliequivalents.	Smart board, white board, handout	Discussions
7th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Calculate problems involving millimoles and milliosmoles.	Smart board, white board, handout	Discussions
8th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Perform calculations for altering product strength by dilution.	Smart board, white board, handout	Discussions
9th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Perform calculations for altering product strength by concentration.	Smart board, white board, handout	Discussions
10th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Perform calculations for preparation and use of stock solutions.	Smart board, white board, handout	Discussions
11th	2	Altering product strength, use of stock solutions, and problem solving by	Apply allegation medial and allegation alternate in problem-solving	Smart board, white board, handout	Discussions

		alligation			
12th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform calculations for adults and paediatric intravenous infusions.	Smart board, white board, handout	Discussions
13th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform calculations for intravenous additives.	Smart board, white board, handout	Discussions
14th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform rate of flow calculations for intravenous fluids.	Smart board, white board, handout	Discussions
15th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Utilize correctly rate of flow tables and nomograms.	Practice Problems	Discussions

#### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Pharmaceutical Calculations 13th Edition Howard C. Ansel
Main references (sources)	
Recommended books and	

references (scientific journals, reports...)

Electronic references, websites

## Course Description Form

1. Course Name:

**Physical pharmacy I**

2. Course Code:

**213**

3. Semester / Year:

**1<sup>st</sup> semester / 2<sup>nd</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.** .....

6. Number of Credit Hours (Total) / Number of Units (Total)

**Two Credit theory hours/week– Two units**

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

Name: Assit. Lec. Taha abdalkhader basheer

8. Course Objectives

**Course Objectives:** To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy

9. Teaching and Learning Strategies

**Strategy**

- Theoretical lectures
- Daily assignments and discussions

10. Course Structure:

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	3	States of Matter	Binding forces between molecules, Gas, liquid and solid states	Smart board, white board, handout	Discussions
2nd	3	States of Matter	Phase equilibria and phase rule.	Smart board, white board, handout	Discussions
3rd	3	States of Matter	Thermal analysis.	Smart board, white board, handout	Discussions
4th	3	Thermodynamic	Thermodynamic: First law	Smart board, white board, handout	
5th	3	Thermodynamic	Thermodynamic: Second law	Smart board, white board, handout	Discussions
					Mid-term Exam
6th	3	Thermodynamic	third law, free energy	Smart board, white board, handout	Discussions
7th	3	Solutions of nonelectrolytes	properties, ideal and real colligative properties	Smart board, white board, handout	Discussions
8th	3	Solutions of nonelectrolytes	Molecular weight determination	Smart board, white board, handout	Discussions
9th	3	solutions of electrolytes	Properties	Smart board, white board, handout	Discussions
10th	3	solutions of electrolytes	Arrhenius theory	Smart board, white board, handout	Discussions

11th	3	solutions of electrolytes	Ionic strength	Smart board, white board, handout	Discussions
12th	3	solutions of electrolytes	Theory of Debye-Huckel	Smart board, white board, handout	Discussions
13th	3	Ionic equilibria	Acid base theory, calculation of pH	Smart board, white board, handout	Discussions
14th	2	Ionic equilibria	The effect of ionic strength	Smart board, white board, handout	Discussions
15th	2	Ionic equilibria	Buffer and isotonic solutions, Buffer and biological systems	Practice Problems	Discussions

#### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Martin's physical pharmacy and pharmaceutical sciences, Patrick J. Sinko. Wolters Kluwer. Lippincott Williams & Wilkins. Philadelphia. 2011. Pharmaceutical Calculations 13th Edition Howard C. Ansel
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

## Course Description Form

1. Course Name:

**Physical pharmacy II**

2. Course Code:

**228**

3. Semester / Year:

**2<sup>nd</sup> semester / 2<sup>nd</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Two Credit theory hours/week– Two units**

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

Name: Assit. Lec. Taha abdalkhader basheer

8. Course Objectives

**Course Objectives:** To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy...It aids the pharmacist to predict the solubility, compatibility and the biological activity of drug products. As a result of this knowledge it will help in the development of new drugs and dosage forms as well as in improvement of various modes of administration

9. Teaching and Learning Strategies

**Strategy**

- Theoretical lectures
- Daily assignments and discussions

10. Course Structure:

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	3	Solubility and distribution	Solubility expression,	Smart board, white board,	Discussions



		phenomena	Solvent –solute interactions, solubility of liquid in liquid	handout	
2nd	3	Solubility and distribution phenomena	Solubility of solids in liquids ,Calculation of solubility of weak electrolytes as influenced by pH	Smart board, white board, handout	Discussions
3rd	3	Solubility and distribution phenomena	Distribution of solutes between immiscible solvents	Smart board, white board, handout	Discussions
4th	3	Kinetics	Rate and order of reactions,	Smart board, white board, handout	
5th	3	Kinetics	Influence of temperature and other factors on reaction rate	Smart board, white board, handout	Discussions
					Mid-term Exam
6th	3	Kinetics	Decomposition of medicinal agents and accelerated stability analysis	Smart board, white board, handout	Discussions
7th	3	Rheology	Newtonian systems, thixotropy	Smart board, white board, handout	Discussions
8th	3	Rheology	Measurement, negative thixotropy	Smart board, white board, handout	Discussions
9th	3	Rheology	Determination of thixotropy	Smart board, white board, handout	Discussions
10th	3	Interfacial	Liquid	Smart board,	Discussions

		phenomena	interfaces, surface free energy	white board, handout	
11th	3	Interfacial phenomena	Measurement of interfacial tension, spreading coefficient	Smart board, white board, handout	Discussions
12th	3	Interfacial phenomena	Surface active agents and wetting phenomena	Smart board, white board, handout	Discussions
13th	3	Colloids	Dispersed systems and its pharmaceutical applications	Smart board, white board, handout	Discussions
14th	3	Colloids	Types of colloidal systems, kinetic properties	Smart board, white board, handout	Discussions
15th	3	Colloids	Optical properties and electrical properties	Practice Problems	Discussions

#### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Martin's physical pharmacy and pharmaceutical sciences, Patrick J. Sinko .Wolters Kluwer. Lippincott Williams &Wilkins. Philadelphia. 2011. Pharmaceutical Calculations 13th Edition Howard C. Ansel
Main references (sources)	
Recommended books and references (scientific journals, reports...)	

Electronic references,  
websites

## Course Description Form

1. Course Name:

**Pharmaceutical technology I**

2. Course Code:

**313**

3. Semester / Year:

**1<sup>st</sup> semester / 3<sup>rd</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Three Credit theory hours/week– Three units**

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

Name: Lec. Dr. Yousif kamal younis

8. Course Objectives

**Course Objectives:** To teach theoretical basis for the technology of preparing different dosage forms with respect to their raw materials, compositions, methods of preparations , stability and uses.

9. Teaching and Learning Strategies

**Strategy**

- Theoretical lectures
- Daily assignments and discussions

10. Course Structure:

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1 <sup>st</sup>	3	Solution & type of solution	Definition of pharmaceutical solution dosage form and differentiation between their types.	Smart board, white board, handout	Discussions
2 <sup>nd</sup>	3	Solubility and factors affecting solubility	Differentiation between the solubility of pharmaceutical ingredients and factors affecting their solubility	Smart board, white board, handout	Discussions
3rd	3	Official solutions	Identification of Official solutions	Smart board, white board, handout	Discussions
4th	3	Aqueous solution & aromatic water	Differentiation between aqueous solutions.	Smart board, white board, handout	
5th	3	Syrups & sugar based syrups	Definition of pharmaceutical syrup dosage form and differentiation between their type.	Smart board, white board, handout	Discussions
					Mid-term Exam
6th	3	clarification	Identification the methods of clarification and the equipment used for clarification	Smart board, white board, handout	Discussions
7th	3	Spirit	Identification the constituents of spirit dosage	Smart board, white board, handout	Discussions

			form and its methods of preparation.		
8th	3	elixir	Identification the constituents of elixir dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
9th	3	Extraction	Knowing the methods of extraction.	Smart board, white board, handout	Discussions
10th	3	maceration	Knowing the methods of maceration	Smart board, white board, handout	Discussions
11th	3	Tinctures	Identification the constituents of Tinctures dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
12th	3	fluid extract	Identification the constituents of fluid extract dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
13th	3	Colloidal dispersion	Knowing the types of colloidal dispersion.	Smart board, white board, handout	Discussions
14th	3	Coarse dispersion	Knowing the types of Coarse dispersion	Smart board, white board, handout	Discussions
15th	3	suspension	Identification the constituents of suspension dosage form and its methods of preparation.	Smart board, white board, handout	Discussions

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Pharmaceutical dosage forms and drug delivery systems by Haward A. Ansel 2. Sprowels American pharmacy. 3-Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd ed. Michael E. Aulton (Author) Churchill
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

### Course Description Form

1. Course Name:

**Pharmaceutical technology II**

2. Course Code:

**328**

3. Semester / Year:

**2<sup>nd</sup> semester / 3<sup>rd</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Three Credit theory hours/week– Three units**

7. Course administrator's name (mention all, if more than one name)	
Name: Lec. Dr. Yousif kamal younis	
8. Course Objectives	
<b>Course Objectives:</b> To teach theoretical bases for the technology of preparing different dosage forms with respect to their raw materials, compositions, methods of preparation, stability, storage and uses; in addition to define and characterize the possible incompatibilities that may occur in dosage forms.	
9. Teaching and Learning Strategies	
<b>Strategy</b>	- Theoretical lectures - Daily assignments and discussions

11. Course Structure:					
Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	3	Emulsion	Purpose of emulsification; methods of emulsification.	Smart board, white board, handout	Discussions
2nd	3	Emulsion	emulsifying agents	Smart board, white board, handout	Discussions
3rd	3	Emulsion	Required HLB calculation ;Stability of emulsion: coalescence and breaking; flocculation and creaming	Smart board, white board, handout	Discussions
4th	3	Lotions; liniments and collodions	Types of lotion, liniment and collodion	Smart board, white board, handout	
5th	3	Suppository	Types of	Smart board,	Discussions

			suppository bases	white board, handout	
					Mid-term Exam
6th	3	Suppository	Preparation of suppositories	Smart board, white board, handout	Discussions
7th	3	Semisolid dosage forms	Ointments, creams and pastes	Smart board, white board, handout	Discussions
8th	3	Semisolid dosage forms	Types of ointment base	Smart board, white board, handout	Discussions
9th	3	Ophthalmic ointment	Ophthalmic ointment	Smart board, white board, handout	Discussions
10th	3	Powdered dosage forms	Methods of reduction and determination particle size	Smart board, white board, handout	Discussions
11th	3	Powdered dosage forms	Bulk and divided powders	Smart board, white board, handout	Discussions
12th	3	Powders and granules	Advantages of granules	Smart board, white board, handout	Discussions
13th	3	Capsules	Hard and soft gelatin capsules	Smart board, white board, handout	Discussions
14th	2	Capsules	Problems of preparation of solid dosage forms	Smart board, white board, handout	Discussions
15th	2	Incompatibility	Physical, chemical and therapeutic incompatibility	Practice Problems	Discussions



Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Pharmaceutical dosage forms and drug delivery systems by Haward A. Ansel 2. Sprowels American pharmacy. 3-Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd ed. Michael E. Aulton (Author) Churchill
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

### Course Description Form

1. Course Name:

**Biopharmaceutics**

2. Course Code:

**414**

3. Semester / Year:

**1<sup>st</sup> semester / 4<sup>th</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Two Credit theory hours/week– Two units**

7. Course administrator's name (mention all, if more than one name)					
Name: Lec. Dr. Yousif kamal younis					
8. Course Objectives					
<p><b>Course Objectives:</b> The course deals with the physical and chemical properties of drug substance, dosage form and the biological effectiveness of the drug or drug product upon administration, including drug availability in the human or animal body from a given dosage form. The pharmacokinetic part of the course deals with the time-course of the drug in the biological system, and quantification of drug concentration pattern in normal subjects and in certain disease states.</p>					
9. Teaching and Learning Strategies					
<b>Strategy</b>		<ul style="list-style-type: none"> <li>- Theoretical lectures</li> <li>- Daily assignments and discussions</li> </ul>			
10. Course Structure:					
Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	2	Introduction to Biopharmaceutics	Definition of Biopharmaceutics, one and two compartment models	Smart board, white board, handout	Discussions
2nd	2	Biopharmaceutics aspects of products	Drug absorption; mechanisms of absorption	Smart board, white board, handout	Discussions
3rd	2	Factors affecting drug absorption	Passive diffusion, active transport and facilitated absorption	Smart board, white board, handout	Discussions
4th	2	Physicochemical factors	Dissolution rate; effects of excipients; type of dosage forms	Smart board, white board, handout	
5th	2	Physicochemical	Effect of	Smart board,	Discussion

		factors	particle size, type of excipients and type of dosage forms	white board, handout	s
					Mid-term Exam
6th	2	One compartment open model	One compartment model after oral and IV	Smart board, white board, handout	Discussions
7th	2	Multi compartment models	Two compartment model after oral and IV	Smart board, white board, handout	Discussions
8th	2	Pharmacokinetics of drug absorption.	Zero order drug absorption model and first order drug absorption model.	Smart board, white board, handout	Discussions
9th	2	Intravenous infusion;	Steady-State Drug Concentration (C <sub>ss</sub> ) and Time Needed to Reach (C <sub>ss</sub> ), loading dose plus IV infusion.	Smart board, white board, handout	Discussions
10th	2	Multiple dosage regimen	Drug accumulation.	Smart board, white board, handout	Discussions
11th	2	Non-linear pharmacokinetics	Reasons for nonlinear pharmacokinetics, saturable enzymatic elimination process	Smart board, white board, handout	Discussions
12th	2	Bioavailability and bioequivalence	Relative and absolute bioavailability	Smart board, white board, handout	Discussions

13th	2	Clearance of drugs from the biological systems.	Renal drug excretion, hepatic elimination	Smart board, white board, handout	Discussions
14th	2	Protein binding of drugs	kinetics of protein binding	Smart board, white board, handout	Discussions
15th	2	Dosage adjustment	Dosage adjustment in renal diseases	Practice Problems	Discussions

#### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Shargel L., Yu AB., (5 <sup>th</sup> Edition). Applied Biopharmaceutics and Pharmacokinetics 2. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3 <sup>rd</sup> Edition Michael E. Aulton (Author). Churchill, Livingstone-Elsevier .....
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

### Course Description Form

1. Course Name:

**Industrial pharmacy I**

2. Course Code:

**4210**

3. Semester / Year:					
2 <sup>nd</sup> semester / 4 <sup>th</sup> year					
4. Description Preparation Date:					
01/03/2024					
5. Available Attendance Forms:					
Theoretical lectures in classroom.					
6. Number of Credit Hours (Total) / Number of Units (Total)					
Three Credit theory hours/week– Three units					
7. Course administrator's name (mention all, if more than one name)					
Name: Lec. Dr. Ahmed Yousif Fadhel Email: ahmed82you@gmail.com					
8. Course Objectives					
<p><b>Course Objectives:</b> The subjective aim of this course is to teach pharmacy students the steps and lines upon which the preformulating processing of pharmaceutical dosage forms. This fundamental course provides the required principles to integrate knowledge of pharmaceutical technology in preformulating of perfect dosage form. It includes milling, mixing, drying and filtration, besides sterilization to achieve a proper processing of dosage forms.</p>					
9. Teaching and Learning Strategies					
<b>Strategy</b>		<ul style="list-style-type: none"> <li>- Theoretical lectures</li> <li>- Daily assignments and discussions</li> </ul>			
10. Course Structure:					
Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	3	Sterilization	Describe different sterilization ways and equipment required.	Smart board, white board, handout	Discussions

2nd	3	Preformulation part 1	Steps required changing an active ingredient into suitable dosage form.	Smart board, white board, handout	Discussions
3rd	3	Preformulation part 2	Solubility and stability of active ingredient in its chosen dosage form.	Smart board, white board, handout	Discussions
4th	3	Clarification and Filtration part 1	Factors affecting filtration processes	Smart board, white board, handout	
5th	3	Clarification and Filtration part 2	Selection suitable filter media for suitable filtration process	Smart board, white board, handout	Discussions
					Mid-term Exam
6th	3	Milling part 1	Describe milling, size distribution and its measurement	Smart board, white board, handout	Discussions
7th	3	Milling part 2	Theory of milling, milling equipment, types of milling and mechanisms of size reduction	Smart board, white board, handout	Discussions
8th	3	Milling part 3	Factors influence milling and selection of mill	Smart board, white board, handout	Discussions
9th	3	Mixing part 1	Fluid mixing and their mechanisms and mixers selection.	Smart board, white board, handout	Discussions
10th	3	Mixing part 2	Solid mixing and their mixing	Smart board, white board, handout	Discussions
11th	3	Mixing part 3	Equipment	Smart board,	Discussions

			mixing and mixer selection	white board, handout	
12th	3	Drying part 1	Definition of drying, Purposes of drying, Psychrometry and Theory of drying	Smart board, white board, handout	Discussions
13th	3	Drying part 2	Behavior of solids during drying and classification of dryers	Smart board, white board, handout	Discussions
14th	3	Sterile product part 1	Product development, solvents, non-aq. Solvents and solutes	Smart board, white board, handout	Discussions
15th	3	Sterile product part 2	Containers, filling procedures and packaging	Smart board, white board, handout	Discussions

#### ١١. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

#### ١٢. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Theory and practice in industrial pharmacy by Lachmann (2009)
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

## Course Description Form

1. Course Name:

**Industrial pharmacy II**

2. Course Code:

**512**

3. Semester / Year:

**1<sup>st</sup> semester / 5<sup>th</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Three Credit theory hours/week– Three units**

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

Name: Lec. Dr. Ahmed Yousif Fadhel

Email: ahmed82you@gmail.com

8. Course Objectives

**Course Objectives:**

This course will cover different type of dosage forms and the ways for their manufacturing also the materials included in their production and the quality control for each one of these types.

9. Teaching and Learning Strategies

**Strategy**

- Theoretical lectures
- Daily assignments and discussions

10. Course Structure:

Week	Hours	Required learning	Unit/Module or Topic Title	Teaching Method	Evaluation method
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		outcomes			
1st	3	Tablets introduction	Definition of tablet, History of tablets, Advantages and disadvantages of tablets, Properties of ideal tablets, Types and classes of tablets.	Smart board, white board, handout	Discussions
2nd	3	tablet continue	Direct compression method for granulation, Dry granulation method, Wet granulation method.	Smart board, white board, handout	Discussions
3rd	3	Evaluation of tablets	Quality Control of Tablets (Pharmacopoeial tests: and Non-pharmacopoeial test: Hardness test, Friability test).	Smart board, white board, handout	Discussions
4th	3	Problems of tableting	Instrumental tablet machine (Machines used in production of tablets, Components of tablet machine, Problems of tablet manufacturing)	Smart board, white board, handout	
5th	3	Tablet coating	Tablets Coating: Purposes of tablet coating, Basic apparatus for tablet	Smart board, white board, handout	Discussions

			coating, Components of tablet coating, Tablet Core properties.		
					Mid-term Exam
6th	3	Quality control of tablets	Methods of evaluation of film coats, Sustained release coating, Enteric coating, New and recent techniques in tab. Coating.	Smart board, white board, handout	Discussions
7th	3	Hard gelatin capsule	Hard gelatin capsules: Definition of Hard gelatin capsules, Advantages and Disadvantages of HGC, Materials used for production of HGC	Smart board, white board, handout	Discussions
8th	3	Evaluation of hard gelatin capsule	Finishing (Pan polishing, Cloth dusting, Brushing, Storage)Special Techniques	Smart board, white board, handout	Discussions
9th	3	Soft gelatin capsule	Definition of Soft gelatin capsules, Composition of SGC, Therapeutic application of soft gelatin capsules, Shapes of capsules	Smart board, white board, handout	Discussions

10th	3	Evaluation of soft gelatin capsule	Nature of Capsule shell (Bloom or gel strength, Viscosity, Iron content, Plasticizers and gelatin). The nature of capsule content.	Smart board, white board, handout	Discussions
11th	3	Microencapsulation	Definition of microencapsulation, Applications of microencapsulation, Fundamentals	Smart board, white board, handout	Discussions
12th	3	Semisolid preparation-I	Properties of semisolid D.F., Types of conventional semisolid D.F, Routes of penetration, Other routes of skin penetration).	Smart board, white board, handout	Discussions
13th	3	Semisolid preparation-II	Factors in skin penetration, Formulation of Semisolid dosage forms, Ingredients used in preparation of semisolids	Smart board, white board, handout	Discussions
14th	3	Aerosols and its quality control	Introduction to Aerosols, Advantages of Aerosols, Components of Aerosols packages.	Smart board, white board, handout	Discussions
15th	3	Quality control of Aerosols	Stability test and quality control of	Smart board, white board,	Discussions

aerosols. handout

### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 40 Marks

Final-Term Exam: 60 Marks

### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Theory and practice in industrial pharmacy by Lachmann (2009)
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

## Course Description Form

1. Course Name:

**Dosage form design**

2. Course Code:

**5212**

3. Semester / Year:

**2<sup>nd</sup> semester / 5<sup>th</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Three Credit theory hours/week– Three units**

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

Name: Lec. Dr. Ahmed Yousif Fadhel  
 Email: ahmed82you@gmail.com

### 8. Course Objectives

#### Course Objectives:

The course deals with the principles and factors that influence design dosage form; and the applications of these principles in the practice of pharmaceutical industry.

### 9. Teaching and Learning Strategies

<b>Strategy</b>	- Theoretical lectures - Daily assignments and discussions
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### 10. Course Structure:

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	2	Introduction to drugs and pharmacy	The development and purpose of the United State Pharmacopeia (USP) and the National Formulary (NF),	Smart board, white board, handout	Discussions
2nd	2	Drug regulation and control	Significant drug regulation and control laws and their impact on pharmacy	Smart board, white board, handout	Discussions
3rd	2	New drug development and approval process	Investigational New Drug (IND) Application from a New Drug Application (NDA)	Smart board, white board, handout	Discussions

4th	2	FDA's Definition of a New Drug	Give examples of the sources of new drug	Smart board, white board, handout	
5th	2	Current good manufacturing practice	the Current Good Manufacturing Practice (cGMP) for finished pharmaceuticals	Smart board, white board, handout	Discussions
					Mid-term Exam
6th	2	Current good compounding practice	extemporaneous compounding	Smart board, white board, handout	Discussions
7th	2	Dosage form Design: Pharmaceutical consideration	The need for the dosage form; preformulation; physical description, microscopic examination	Smart board, white board, handout	Discussions
8th	2	Pharmaceutical consideration	Melting point; phase rule; particle size; polymorphism.	Smart board, white board, handout	Discussions
9th	2	Pharmaceutical consideration	Permeability; pH; partition coefficient; pka; stability; kinetics; shelf life; rate reaction; enhancing stability	Smart board, white board, handout	Discussions
10th	2	Formulation consideration:	Excipients definition and typed; Appearance; palatability;	Smart board, white board, handout	Discussions
11th	2	Formulation consideration:	Flavoring; sweetening; coloring pharmaceuticals; preservatives;	Smart board, white board, handout	Discussions

			sterilization; preservatives selection.		
12th	2	Biopharmaceutical consideration	Principle of drug absorption	Smart board, white board, handout	Discussions
13th	2	Biopharmaceutical consideration	Dissolution of drugs.	Smart board, white board, handout	Discussions
14th	2	Pharmacokinetic considerations	Bioavailability and bioequivalence; FDA requirements, Assessment of bioavailability; bioequivalence among drug products.	Smart board, white board, handout	Discussions
15th	2	Pharmacokinetic considerations	Pharmacokinetic principles: half life; clearance; dosage regimen considerations.	Smart board, white board, handout	Discussions

#### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 30 Marks

Final-Term Exam: 70 Marks

#### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ansel's pharmaceutical dosage forms and drug delivery 10th Edition by Loyd Allen (Author) 2011
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	

## Course Description Form

1. Course Name:

**Pharmaceutical biotechnology**

2. Course Code:

**516**

3. Semester / Year:

**2<sup>nd</sup> semester / 5<sup>th</sup> year**

4. Description Preparation Date:

**01/03/2024**

5. Available Attendance Forms:

**Theoretical lectures in classroom.**

6. Number of Credit Hours (Total) / Number of Units (Total)

**Three Credit theory hours/week– Three units**

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

Name: Lec. Dr. Ahmed Yousif Fadhel  
Email: ahmed82you@gmail.com

8. Course Objectives

**Course Objectives:**

Give an introduction to biotechnology science and types and uses of biotechnology products. The course also shows methods of formulation of biotechnology product and route of administration protein product to body. In addition to studying the pharmacokinetics of peptides and proteins.

9. Teaching and Learning Strategies

**Strategy**

- Theoretical lectures
- Daily assignments and discussions

10. Course Structure:

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Evaluation method
1st	1	Introduction to	Biotechnology	Smart board,	Discussion



		Biotechnology	Molecular biotechnology Biopharmaceuticals Drugs Pharmaceutics biotechnology Pharmaceutical Biotechnology Products	white board, handout	s
3rd	3	Formulation of biotechnology product (biopharmaceutical consideration)-	Microbial consideration Microbial consideration- Sterility-pyrogen viral decontamination	Smart board, white board, handout	Discussion s
7th	3	Excipients of parenteral products-solubility enhancer-anti adsorption agents	components found in parenteral formulations of biotech product 1- Solubility enhancers 2-Anti-adsorption and anti-aggregation agents	Smart board, white board, handout	Discussion s
8th	1	Buffer components-preservatives-osmotic agents	Buffer components Preservatives and Anti-oxidants Osmotic Agents Freeze-Drying of Proteins Importance of Freeze Drying ,Typical excipients in a freeze-dried protein formulation	Smart board, white board, handout	
9th	1	Delivery of protein, route of administration	The parenteral Route of Administration The Oral Route of Administration	Smart board, white board, handout	Discussion s

					Mid-term Exam
10th	1	The potential pros and cons for different relevant routes Approaches to enhance bioavailability of proteins	Protein delivery: Alternative route of proteins administration	Smart board, white board, handout	Discussions
11th	1	Pharmacokinetics of protein therapeutics Absorption of protein therapeutics, Strategies to overcome the obstacles associated with oral delivery of proteins IV versus SC	Pharmacokinetics and Pharmacodynamics of Peptide and Protein Drugs	Smart board, white board, handout	Discussions
12th	1	Distribution Mechanisms and Volumes Pharmacokinetics of proteins Therapeutics Distribution via Receptor-Mediated Uptake	Distribution of protein therapeutics	Smart board, white board, handout	Discussions
13th	1	Gastrointestinal Protein Metabolism	Elimination of Protein Therapeutics Proteolysis	Smart board, white board, handout	Discussions
14th	1	glomerular filtration, Tubular absorption and Postglomerular peritubular	Renal Protein Metabolism and Excretion	Smart board, white board, handout	Discussions
15th	1	Receptor-mediated endocytosis Direct shuttle or	Hepatic Protein Metabolism	Smart board, white board, handout	Discussions

		transcytotic pathway And Receptor-Mediated Protein Metabolism			
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### ۱۱. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Mid-Term Exam: 30 Marks

Final-Term Exam: 70 Marks

### ۱۲. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Pharmaceutical biotechnology by J.A. Crommelin, Robert D. Syinder. 2. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd Edition Michael E. Aulton (Author). Churchill, Livingstone- Elsevier
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic references, websites	