Republic of Yemen

Ministry of Higher Education & Scientific Research

21 September University for Medicals and Applied Sciences

Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Specification of

Physical Pharmacy

Course Code. (02.02.227)

2022

T4: This Template is Developed and Approved by CAQA-Yemen, 2024

Prepared by:	Reviewed by:	Head of the Department:	Quality Unit:	Dean
Dr. Mohammed Addoais	Dr. Abdulelah Thabet		Dr. Abdulelah Thabet	Dr. Ali Alyahawi

I. General Information:

1.	Course Title:	Physical Pharmacy				
2.	Course Code:	02.02.227				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		3	2		1	-
4.	Level/ Semester at which this Course is offered:	Second Level / First Semester				
5.	Pre –Requisite (if any):	Medical Physics				
6.	Co –Requisite (if any):	-				
7.	Program (s) in which the Course is Offered:	Bachelor of Clinical Pharmacy & Pharm. D.				
8.	Language of Teaching the Course:	English				
9.	Location of Teaching the Course:	Faculty of Clinical Pharmacy				
10.	Prepared by:	Mohammed Addoais				
11	Date and Number of Approval by Council:					

II. Course Description:

This course provides the students with knowledge of physicochemical principles essential for the design and formulation of pharmaceutical products. Students are introduced to the fundamental concepts of solubility, dissolution, partition coefficient, drug incompatibility, drug stability, complexation, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behavior of dosage forms.

	II. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs
	A. Knowledge and Understanding:	**I, P or M/A**	
a1	Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena.		A1
a2	Identify the reaction kinetics and drug degradation pathways.		
	B. Intellectual Skills:		
b1	Utilize the fundamental basics of physical pharmacy in dosage form.		B1, B2
b2	Interpret the influence of physicochemical properties on formulation of drug products		B1
	C. Professional and Practical Skills:		
c1	Measure the Surface tension, solubility, viscosity and partition coefficient of some pharmaceutical substance		C1
c2	Calculate the reaction kinetic order and expiry date of some pharmaceutical substance.		
	D. Transferable Skills:		
d1			
d2			
I= Introduced, P=Practiced or M/A= Mastered/Advanced			

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena.	▪ Lecture ▪ Instructor – student Interactive ▪ Office hour	▪ Exam ▪ Assignment ▪ Quiz
a2	Identify the reaction kinetics and drug degradation pathways.		
	(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	Utilize the fundamental basics of physical pharmacy in dosage form design.	▪ Lecture ▪ Instructor – student Interactive ▪ Exercises ▪ Solving Problem Methods	▪ Problem-Solving Exercises. ▪ Assignment ▪ Quiz
b2	Interpret the influence of physicochemical properties on formulation of drug products		
	(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
c1	Measure the Surface tension, solubility, viscosity and partition coefficient of some pharmaceutical substance	▪ Lecture ▪ Instructor – student Interactive ▪ Self-Learning	▪ Exam ▪ Assignment ▪ Quiz
c2	Calculate the reaction kinetic order and expiry date of some pharmaceutical substance.		
	(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
d1		▪	▪
d2		▪	▪

IV. Course Contents:

A. Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction to physical pharmacy**	a1,a2, b1,b2	▪ Definitions ▪ Importance ▪ Course outline ▪ Course objective	1	2
2	**Solubility and distribution phenomena**	a1,a2, b1,b2	▪ Definition ▪ Dissolution process. ▪ Factors influencing solubility ▪ Solubility expression ▪ Classification of solvents ▪ Solubility of gas, liquid and solid in liquids ▪ Solubilizing approaches ▪ Partition coefficient ▪ Application of partition coefficient	2	4
3	**Surface and Interfacial Tensions**	a1,a2, b1,b2	▪ Definitions ▪ Importance in pharmacy ▪ Adhesional and cohesional forces ▪ Spreading and wetting ▪ Surface active agents	**2**	**4**
4	**Viscosity and rheology**	a1,a2, b1,b2	▪ Definition and importance ▪ Types of flow of liquids ▪ Measurement of viscosity	**2**	4
5	**Mid-term Exam**	a1,a2, b1,b2		**1**	2
6	**Micromeritics**	a1, a2, b1, b2	▪ Definitions and importance ▪ Effect of particle size ▪ Powder flow ▪ Factors affecting powder flow ▪ Powder flow testing	1	2

7	**Drug incompatibility**	a1,a2, b1,b2	▪ Definitions ▪ Types of drug incompatibility ▪ Causes of incompatibilities ▪ Stabilization of drugs against drug incompatibilities	**2**	**4**
8	**Drug stability and kinetics**	a1,a2, b1,b2	▪ Definitions ▪ Importance ▪ Factors affecting drug stability ▪ Types of degradation ▪ Types of stability studies ▪ Drug stability and kinetics ▪ Shelf life estimation	**2**	**4**
9	**Complexation**	a1,a2, b1,b2	▪ Definition ▪ Types of complexes ▪ Application of complexation in pharmacy	1	**2**
10	**Adsorption & Isotonicity**	a1,a2, b1,b2	▪ Definition ▪ Application of adsorption of drugs in pharmacy ▪ Isotonicity	**1**	**2**
11	**Final Exam**	a1,a2, b1,b2		**1**	2
Number of Weeks /and Units Per Semester				**16**	**32**

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Types crystals, and of solvents used to form this crystals	1	2	c1. c2
2	Solubility measurement	1	2	c1. c2
3	Study the effect of buffer and pH on solubility	1	2	c1. c2
4	Surface tension measurement	1	2	c1. c2
5	Critical micelle concentration determination	1	2	c1. c2
6	Hydrophilic –lipophilic balance (HLB) determination	1	2	c1. c2
7	Viscosity measurement	1	2	c1. c2
8	**Midterm practical exam**	1	2	c1. c2
9	Determine the adsorption of some pharmaceutical substances	2	4	c1. c2
10	Isotonocity calculation	1	2	c1. c2
11	Drug incompatibility (interaction) experiment	1	2	c1. c2

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
12	Study the factors affecting drug stability	1	2	c1. c2
13	Determine the drug order of some pharmaceutical substances	1	2	c1. c2
14	Calculation of shelf-life	1	2	c1. c2
15	**Final Exam**	1	2	c1, c2
Number of Weeks /and Units Per Semester		**16**	32	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1.	NA			
2.				
3.				
Number of Weeks /and Units Per Semester				

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Assignment 1**	W 1st -6th	**5**	a1, a2, b1, b2, c1, c2
Total			**5**	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6th	5	5%	a1, a2, b1, b2, c1, c2
2	Practical Reports	2nd -13th	5	5%	c1, c2
3	Midterm Exam (Theory)	Week 7	15	15%	a1, a2, b1, b2
	Midterm Exam (Practical)	Week 7	10	10%	c1, c2
4	Final Practical Exam	14th	15	15%	a1, a2, b1, b2
5	Final Exam (Theory)	Week 16	50	50%	a1, a2, b1, b2
6	Total		100	100%	

Prepared by: Dr. Mohammed Addoais | Reviewed by: Dr. Abdulelah Thabet | Head of the Department: Dr. Abdulelah Thabet | Quality Unit: | Dean: Dr. Ali Alyahawi

VII. Learning Resources:

1- Required Textbook(s):

1- Patrick J. Sinko (2016). Martin's Physical Pharmacy and Pharmaceutical Sciences. 7th edition, Lippincott Williams & Wilkins., Philadelphia.
2- Florence, A.T. (2016). Physicochemical Principles Of Pharmacy, 6th edition, Pharmaceutical Press, London.

2- Essential References.

1- Deeliprao D. (2015). Essentials of physical pharmacy. 2nd edition, Pharmamed press

3- Electronic Materials and Web Sites *etc*.

1. http://www.pharmatutor.org
2. http://www.uspbpep.com
3. http://www.usp.org

VIII. Course Policies: (Based on the Uniform Students' By law (2007)

1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply**.**
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Plan (Syllabus) of Physical Pharmacy

Course Code. 02.02.227

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Mohammed addoais	**Office Hours**					
Location& Telephone No.:	**776440327**						
E-mail:	Addoais1@gmail.com	SAT	SUN	MON	TUE	WED	THU

2022

Prepared by:	Reviewed by:	Head of the Department:	Quality Unit:	Dean
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7.	Program (s) in which the Course is Offered:	Bachelor of Clinical Pharmacy & Pharm. D.				
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IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	A. Knowledge and Understanding:
a1	Describe the interfacial phenomena and surface-active agents and Identify adsorption/desorption phenomena
a2	Identify the reaction kinetics and drug degradation pathways.
	B. Intellectual Skills:
b1	Predict the possible drug incompatibility problems arises during dosage forms formulation.
b2	Utilize the fundamental basics of physical pharmacy in dosage form.
	C. Professional and Practical Skills:
c1	Measure the Surface tension, solubility, viscosity, and partition coefficient of some pharmaceutical substance
c2	Calculate the reaction kinetic order and expiry date of some pharmaceutical substance
	D. Transferable Skills:
d1	
d2	

V. Course Contents:

A. Theoretical Aspect:

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			coefficient		
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