

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

Pharmaceutics (1)

Course Code. (02.02.229)

2022



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

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Mohammed Addoais	Dr. Hamoud Al-bayley	Dr. -----	Dr. Abdulelah Thabet	Dr. Ali Alyahawi

I. General Information:

1.	Course Title:	Pharmaceutics (1)			
2.	Course Code:	02.02.229			
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours
			Lecture	Tutorial/Seminar	Lab Clinical
		3	2		2 -
4.	Level/ Semester at which this Course is offered:	2 nd Level / 2 nd Semester			
5.	Pre –Requisite (if any):	Physical pharmacy			
6.	Co –Requisite (if any):	Pharmaceutical calculation			
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 will provide pharmacy students with a detailed knowledge and understanding of pre-formulation concepts, design and formulation of a different pharmaceutical dosage forms and drug delivery system. It covers the concepts and theories of the dispersed systems including suspensions and emulsions. It also discusses the classification of liquid dosage forms used via the different routes of administration and methods of the preparation of solution and various dispersed systems. It focused on the advantages and disadvantages, additives methods of formulation and methods of evaluation of different pharmaceutical liquid 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	Identify the characteristics of different pharmaceutical dosage forms and routes of drug administration.		A3
a2	Recognize the different additives used in manufacturing of pharmaceutical liquid dosage forms.		A3, A6
B. Intellectual Skills:			
b1	Distinguish pharmaceutical liquid dosage forms.		B3
b2	Predict instability problems in selected products and suggest solutions for these problems.		B3
C. Professional and Practical Skills:			
c1	Formulate different pharmaceutical liquid dosage forms.		C2
c2	Utilize appropriate laboratory techniques in preparing solution, suspension and emulsion.		C2
D. Transferable Skills:			
d1	Implement writing and presentation skills		D2
d2	Work independently or collaboratively to prepare seminars/ presentations or write reports.		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	Identify the characteristics of different pharmaceutical dosage forms and routes of drug administration.	- Lecture - Instructor – student Interactive - Office hour	- Exam - Assignment - Quiz
a2	Recognize the different additives used in manufacturing of pharmaceutical liquid dosage forms.	- Lecture - Instructor – student Interactive - Office hour	- Exam - Assignment - Quiz

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Distinguish pharmaceutical liquid dosage forms..	- Lecture - Instructor – student Interactive - Exercises - Solving Problem Methods	- Problem-Solving Exercises. - Assignment - Quiz
b2	Predict instability problems in selected products and suggest solutions for these problems.	- Lecture - Instructor – student Interactive - Exercises - Solving Problem Methods	- Problem-Solving Exercises. - Assignment - Quiz

(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	Formulate different pharmaceutical liquid dosage forms.	- Lecture - Instructor – student Interactive - Self-Learning	- Exam - Assignment - Quiz
c2	Utilize appropriate laboratory techniques in preparing solution, suspension and emulsion..	- Lecture - Instructor – student Interactive - Self-Learning	- Exam - Assignment - Quiz

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Implement writing and presentation skills	- Self-Learning - Seminar - Exercises	- Presentation - Assignment - Quiz
d2	Work independently or collaboratively to prepare seminars/ presentations or write reports.	- Seminar - Instructor–student Interactive - Exercises	Presentation



IV. Course Contents:

A. Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction to pharmaceuticals	a1, a2, b1, b2,	- Definitions - Classification of pharmaceutical dosage form.	1	2
2	Pre-formulation studies	a1, a2, b1, b2, c1, c2, d1, d2	- Study of physical properties of drug and its effect on formulation like - Solubility - Particle size and Shape and surface area - Ionization constant - Crystal Properties and Polymorphism - Powder flow - Partition coefficient. - Dissolution - Stability	2	4
3	Pharmaceutical solvent and excipients	a1, a2, b1, b2, c1, c2, d1, d2	- Types - Functions - Ideal properties - Excipients compatibility - Selection of solvent	2	4
4	Pharmaceutical solution	a1, a2, b1, b2, c1, c2, d1, d2	- Advantage and disadvantages of solution - Formulation (vehicles used and additives) - Types of water - Aromatic water - Classification of pharmaceutical solution - Aqueous solution (types and properties) - Non aqueous solution (types and properties) - Stability of solution - Manufacture of solution	3	6
6	Mid-term Exam			1	2
7	Pharmaceutical suspension	a1, a2, b1, b2, c1, c2, d1, d2	- Pharmaceutical application of suspension - Types of suspensions - Formulation of suspension - Difference between	3	6

			Flocculation, deflocculation. - Importance of zeta potential - Factors affecting sedimentation rate of suspension. - Formulation of various types of suspensions. - Flocculating agents - Viscosity modifiers - Formulation additives - Suspending agents - Physical stability of suspension ■ Evaluation of suspension		
8	Pharmaceutical Emulsion	a1, a2, b1, b2, c1, c2, d1, d2	- Definition - Emulsion types - Pharmaceutical application of emulsion - Emulsion formulation - Choice of emulsion type, and oil phase - Emulsion consistency - Classification of emulsifying agents - Selection of type and concentration of emulsifying agents HLB (hydrophilic lipophilic balance) - Choice of emulsifying agent. - Preparation of emulsion - Identification of emulsion type - Stability of emulsion ■ Preparation of emulsion:	3	6
	Final exam	a1, a2, b1, b2, c1, c2, d1, d2	-	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	Formulate, practice preparation, label and evaluate topical aqueous solutions.	2	4	c1, c2, d1, d2
2	Formulate, practice preparation, label and evaluate oral aqueous solutions.	2	4	c1, c2, d1, d2
3	Formulate, practice preparation, label and evaluate topical non-aqueous solutions.	2	4	c1, c2, d1, d2
4	Midterm practical exam	1	2	c1, c2, d1, d2
9	Formulate, practice preparation, label and evaluate oral non-aqueous solutions.	2	4	c1, c2, d1, d2
10	Formulate, practice preparation, label and evaluate pharmaceutical emulsions.	3	6	c1, c2, d1, d2
11	Formulate, practice preparation, label and evaluate pharmaceutical suspensions.	3	6	c1, c2, d1, d2
	Final practical exam	1	2	c1, c2, d1, d2
Number of Weeks /and Units Per Semester		16	32	

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Assignment 1	6th	5	a1, a2, b1, b2, c1, c2, d1, d2
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, d1, d2
2	Practical Reports	2 nd -13 th	5	5%	c1, c2, d1, d2
3	Midterm Exam (Theory)	Week 7	15	15%	a1, a2, b1, b2, d1, d2
4	Midterm Exam (Practical)	Week 7	10	10%	c1, c2
5	Final Practical Exam	14 th	15	15%	c1, c2
6	Final Exam (Theory)	Week 16	50	50%	a1, a2, b1, b2

VII. Learning Resources:

1- Required Textbook(s):

- 1- Michael E. Aulton Kevin G Taylor. (2013). Pharmaceutics, the design and manufacture of medicines, 4th edition, Churchill Livingstone.
- 2- H.C. Ansel (2011). Pharmaceutical Dosage Forms and drug Delivery Systems, 9th ed. Philadelphia; London. Lea & Febiger.
- 3- E.A. Rawlins (2010) . Bentley's textbook of pharmaceutics. 8th ed. India, Elsevier.
- 4- David Jones (2008). Fast track, "Pharmaceutical Dosage Form and Design". London, Pharmaceutical. Press.

2- Essential References.

- 1- Loyd v.allen (2015). Remington : The science of practice of pharmacy. 22nd ed. Pharmaceutical press.
- 2- Alison Bradfield (2017). Martindale the complete drug reference. 39th ed. Pharmace press.

3- Electronic Materials and Web Sites etc.

1. <http://www.pharmatutor.org>
2. <http://www.uspbpep.com>
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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 **Pharmaceutics (1)**

Course Code. 02.02.229

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

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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 | Identify the characteristics of different pharmaceutical dosage forms and routes of drug administration. |
| a2 | Recognize the different additives used in manufacturing of pharmaceutical liquid dosage forms. |

B. Intellectual Skills:

- | | |
|----|---|
| b1 | Distinguish pharmaceutical liquid dosage forms. |
| b2 | Predict instability problems in selected products and suggest solutions for these problems. |

C. Professional and Practical Skills:

- | | |
|----|--|
| c1 | Formulate different pharmaceutical liquid dosage forms. |
| c2 | Utilize appropriate laboratory techniques in preparing solution, suspension and emulsion.. |

D. Transferable Skills:

- | | |
|----|--|
| d1 | Implement writing and presentation skills |
| d2 | Work independently or collaboratively to prepare seminars/ presentations or write reports. |

V. Course Contents:

A. Theoretical Aspect:

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2	Pre-formulation studies	a1, a2, b1, b2, c1, c2, d1, d2	- Study of physical properties of drug and its effect on formulation like - Solubility - Particle size and Shape and surface area - Ionization constant - Crystal Properties and Polymorphism - Powder flow	2	4

			- Partition coefficient. - Dissolution ▪ Stability		
3	Pharmaceutical solvent and excipients	a1, a2, b1, b2, c1, c2, d1, d2	▪ Types ▪ Functions ▪ Ideal properties ▪ Excipients compatibility ▪ Selection of solvent	2	4
4	Pharmaceutical solution	a1, a2, b1, b2, c1, c2, d1, d2	▪ Advantage and disadvantages of solution ▪ Formulation (vehicles used and additives) ▪ Types of water ▪ Aromatic water ▪ Classification of pharmaceutical solution ▪ Aqueous solution (types and properties) ▪ Non aqueous solution (types and properties) ▪ Stability of solution ▪ Manufacture of solution	3	6
6	Mid-term Exam			1	2
7	Pharmaceutical suspension	a1, a2, b1, b2, c1, c2, d1, d2	- Pharmaceutical application of suspension - Types of suspensions - Formulation of suspension - Difference between Flocculation, deflocculation. - Importance of zeta potential - Factors affecting sedimentation rate of suspension. - Formulation of various types of suspensions. - Flocculating agents - Viscosity modifiers - Formulation additives - Suspending agents - Physical stability of suspension ▪ Evaluation of suspension	3	6
8	Pharmaceutical Emulsion	a1, a2, b1, b2, c1, c2, d1, d2	- Definition - Emulsion types - Pharmaceutical application of emulsion - Emulsion formulation - Choice of emulsion type,	3	6

			- and oil phase - Emulsion consistency - Classification of emulsifying agents - Selection of type and concentration of emulsifying agents HLB (hydrophilic lipophilic balance) - Choice of emulsifying agent. - Preparation of emulsion - Identification of emulsion type - Stability of emulsion ■ Preparation of emulsion:		
	Final exam	a1, a2, b1, b2, c1, c2, d1, d2	-	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)
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2	Formulate, practice preparation, label and evaluate oral aqueous solutions.	2	4	c1, c2, d1, d2
3	Formulate, practice preparation, label and evaluate topical non-aqueous solutions.	2	4	c1, c2, d1, d2
4	Midterm practical exam	1	2	c1, c2, d1, d2
9	Formulate, practice preparation, label and evaluate oral non-aqueous solutions.	2	4	c1, c2, d1, d2
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