Faculty: Pharmacy	
Department: Pharmaceutical sciences	**Program: MSc**
Semester: 1st	**Academic year:** 2023 – 2024

Course Plan

First: Course Information

Course Number: 1101704	***Course Name:*** Advanced Physical Pharmacy ***Credit Hours:*** *2 hour*		
Prerequisite: N/A	***Section Number:*** 1 ***Lecture Time:*** Saturday 9:00 am – 12:00		
JNQF Level	***9***	***Virtual hours in the JNQF***	***80 h***
Course Nature:	***Mandatory Faculty Requirement*** ☐ ***Optional University Requirement*** ☐ ***Mandatory University Requirement*** ☐ ***Faculty Requirement*** ☐ ***Ancillary Course*** ☐ ***Optional Specialty Requirement*** ☐ ***Mandatory Specialization requirement*** ☑		
Type of Education:	***1)*** **fully Direct (Fully Face-to-Face Education** ☑ **Integrated Education(2 Face-to-Face + 1Asynchronous)** ☐ ***2)*** **Synchronous *1+* Asynchronous (Electronic Education Fully** ☐		

Second: Instructor's Information

Name:	***Academic Rank:***	
Office Number: 240 H	***Phone Ext:***	***Email:ahlamk@zu.edu.jo***
Office Hours:		

Third: Short Description of the Course

This is an advanced course where pharmacy students cover physicochemical aspects that are relevant to the design, manufacture and stability of dosage forms, with emphasis on such topics as covers solubility, diffusion, dissolution and interfacial phenomena. This also includes physicochemical methods for the characterization of pharmaceutical preparations and methods of measurement of drug physicochemical properties (pH, refraction index, viscosity, surface tension, zeta potential, particle size, etc.). It covers also solid state properties, solid phase transitions and their consequences on pharmaceutical product formulation.

Fourth: Course Objectives

- Develop a working understanding of thermodynamics of pharmaceutical systems
- Describe the major types of solid-state properties and the principles of measurement of drug physicochemical properties.
- Explain basic concepts in solid phase properties and the physicochemical principles of pharmaceutics.
- Interpret the interrelations between the physical properties of the raw materials and those of the pharmaceutical formulations and final dosage forms.
- Analyze research studies results.
- Assess the need for preparation of new formulation systems for pharmaceutical use.
- Apply critical thinking in the assessment of problems.

Fifth: Learning Outcomes

Level descriptor according to (JNQF)	***CILOs Code***	***CILOs*** If any CLO will not be assessed in the course, mark NA.	***Associated PILOs Code*** *Choose one PILO for each CILO**	***Assessment method*** *Choose at least two methods*	***Scores out of 100*** State the total score identified for each CILO	***Minimum acceptable Score/percentage (%)*** *The percentage should not be less than 70% **
Knowledge	**K1**	Describe the major types of solid-state properties and the principles of measurement of drug physicochemical properties .	P.K1	Midterm and final	20	14, (70%)
	K2	Explain basic concepts in solid phase properties and the physicochemical principles of pharmaceutics	P.K1	Midterm Final exam	20	14, (70%)
Skills	**S1**	Interpret the interrelations between the physical properties of the raw materials and those of the pharmaceutical formulations and final dosage forms	P.S1	Midterm Final exam Research project	15	10.5 (70%)
	S2	Distinguish various pieces of equipment used for formulation	P.S1	Midterm Final exam	10	7 (70%)

	S3	Analyze research studies results.	P.S1	Midterm Final exam Research project	20	14 (70%)
Competencies	**C1**	Assess the need for preparation of new dispersion systems for pharmaceutical use	P.C3		5	3.5 (70%)
	C2	Apply critical thinking in assessment of problems	P.C3		**10**	7 (70%)

*For each CILO, the PILO could be the same or different
****80% of the students*** must achieve the minimal acceptable percentage or higher for each CILO

Sixth : Learning Source

Text Book: Remington: The science and practice of pharmacy		
Author: Remington, J. P	***Edition :***23th Edition	***Year:****2020*

Text Book: Martin's Physical Pharmacy and Pharmaceutical Sciences By: Patrick J. Sinko, Lippincott Williams &Wilkins, 6th Edition		
Author: Patrick Sinko	***Edition :***6th Edition	***Year:****2022*

References :	• Loyd V. Allen, Jr, Howard C. Ansel., Ansel's Pharmaceutical Dosage • Forms and Drug Delivery Systems, 10thEdition • The theory and practice of industrial pharmacy by Lachman and Lieberman (3rd edition)
Teaching Type:	***Classroom*** ☑ ***Laboratory*** ☐ ***Workshop*** ☐ **MS Teams** ☐ **Moodle** ☑

Seventh: Course Structure

Lecture Date	Topics	Teaching Procedures	Teaching Methods	Covered CILOs
21/10/2023	Introduction to thermodynamics	Face to Face	Class room discussion, group discussion	K1, K2

28/10/2023	Introduction to thermodynamics (II): Applications of Free Energy in Drug Delivery	Face to Face	Class room discussion, group discussion	S1, S3
04/11/2023	Solid-state properties	Face to Face	Class room discussion, group discussion, practical session	S1, S2, C1
11/11/2023	Pharmaceutical Materials Characterization	Face to Face	Practical Session	K1, S1, S2
18/11/2023	Solubility of Pharmaceutical Materials	Face to Face	Class room discussion, group discussion, practical session	K1, K2
25/11/2023	Thermodynamic Considerations of Solubility	Face to Face	Class room discussion, group discussion, practical session	S1, S2, C1
02/12/2023	Mass transfer phenomena	Face to Face	Class room discussion, group discussion, practical session	K1, K2
09/12/2023	Drug release and dissolution kinetics	Face to Face	Class room discussion, group discussion, practical session	K1, S1, S2
16/12/2023	Practical Session	Face to Face	Practical Session	K1, S1, S2
23/12/2023	Student Research Project Presentations I	Face to Face	Class room discussion, group discussion, practical session	S1, S2, C1,C2
30/12/2023	Student Research Project Presentations II	Face to Face	Class room discussion, group discussion, practical session	S1, S2, C1,C2
06/01/2024	Student Research Project Presentations III	Face to Face	Class room discussion, group discussion, practical session	S1, S2, C1,C2

Education procedures: (Face to Face, synchronous, asynchronous). * * Teaching methods: Lecture, video…..). * * Reference: Pages of the book, recorded lecture, video….).

Eighth: Assessment methods

Methods	Fully Electronic Education	Integrated Teaching	Direct Teaching	Specific Course Output to be measured *State the score identified for each CILO for each method of assessment out of 100 **If any CILO will not be assessed in the course, mark NA.						
				K1	K2	S1	S2	S3	C1	C2
Mid-term Exam			30	**10**	**10**	**-**	**5**	**5**	**-**	**-**
Research Project			30	**-**	**-**	**10**	**-**	**10**	**-**	**10**
Final Exam			40	**10**	**10**	**5**	**5**	**5**	**5**	**-**
Total out of 100			100	**20**	**20**	**25**	**10**	**20**	**5**	**10**

Nineth: Course Polices

- Meeting the deadline for the lecture.
- Commitment to interaction and participation.
- Interactive lectures will be given through a platform (MS Teams).
- Duties and tests will be given through a platform(Moodle).
- Commitment to the right appearance in front of the camera with the proper background.
- University regulations for attendance and absence from lectures and examinations are in force.

- Academic Integrity: Fraud or moral impersonation are unacceptable and are punishable according to university regulations and instructions.

Approval	Name	Date	Signature
Head of Department	Dr. Hana Abu Sawan	2/3/2023	
Faculty Dean	Dr. Ahlam Al-kilani	2/3/2023	