The Hashemite University

الجامعـــــــــة الهاشميـــــــــة

Faculty of Pharmaceutical Sciences

Syllabus: Physical Pharmacy 2 (131701333)
Second Semester 2021 /2022

COURSE INFORMATION	
Course Name: Physical Pharmacy 2 (face-to-face education) **Semester:**Second **Department:**Department of Department of Pharmaceutics and Pharmaceutical Technology **Faculty:** Pharmaceutical Sciences	**Course Code:** 131701333 **Section:** **Core Curriculum**: Compulsory
Day(s) and Time(s): : Sun, Mon, Tues: TBA Mon, Wed: TBA **Classroom: TBA**	**Credit Hours:** 2 **Prerequisites**: Physical Pharmacy 1 (131701317)

COURSE DESCRIPTION

This course addresses the basic physicochemical principles that determine the behavior of pharmaceutical materials in different physical and biological systems related to drug formulation and delivery. Diffusion, drug release and dissolution, chemical kinetics and stability, colloidal and coarse dispersions, interfacial phenomena, rheology, and complexation are thoroughly discussed.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Collaborative learning through small groups acting in an interdisciplinary context.
- E-learning resources: e-reading assignments and practice quizzes through Model and Microsoft Team

FACULTY INFORMATION

Name	**Dr.Areen Sulaiman Alshweiat**
Academic Title:	**Assistant Professor**
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REFERENCES AND LEARNING RESOURCES

Required Textbook

1. Sinko, P.J. Martin's Physical Pharmacy, 6 th edition, Lippincott Williams & Wilkins, 2011

Suggested Additional Resources:

1. Florence A.T. and Attwood. D. Physicochemical Principles of Pharmacy, 5th Edition. 2011. Published by Pharmaceutical Press, UK
2. Ma, J. K., & Hadzija, B. (2013). Basic physical pharmacy. Jones & Bartlett Publishers.
3. Amiji, M.M., Cook, TJ., and Mobley, W.C. Applied Physical Pharmacy, 2nd edition, McGraw Hill Education, 2014
4. Dash, A.K., Singh, S. and Tolman, J. Pharmaceutics: Basic Principles and Application to Pharmacy Practice. Elsevier Academic Press, 2014

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
CLO-1 Think critically and creatively in a variety of methods in order to make decisions and solve problems.	1: Apply critical thinking and demonstrate problem-solving skills in two or more of the major fields of physical pharmacy.	1. Develop an understanding of the principles of physical pharmacy.	1.1. Understand the rationale and theory related to discussed topics and recognize their pharmaceutical application	• Exams • Quizzes • homework assignments
		2. Provide the theoretical knowledge and understanding of the physicochemical principles related to pharmaceutical systems	2.1. Recognize basic rules and equations regarding physical principles essential for pharmaceutical applications.	• Exams • Quizzes
		3. Learn to solve problems.	3.1. Solve problems related to diffusion, drug release, dissolution, chemical kinetics, and HLB.	• Exams • Quizzes • homework assignments
		4. Develop the ability to employ the principles in the development of pharmaceutical dosage forms and solving related formulation and manufacturing problems.	4.1. Recognize the application of concepts in formulation and storage of different dosage forms.	• Exams • Quizzes • homework assignments
CLO-2 Demonstrate competency in the use of research skills and various information sources.	2: Use modern literature search methods to obtain information about physical pharmacy topics and write reports.	1. Obtain an understanding of the role of physical pharmacy in pharmaceutical application.	1.1. Acquire the ability to learn independently; articulate the importance of independent learning for future professional development.	• "On-line" reading assignments • Term project
CLO-3 Communicate competently with others using oral and written English skills	3: To develop critical thinking, problem solving and decision making abilities	1. Acquire positive attitudes towards further studies in the topics of physical pharmacy.	1.1. Develop a positive attitude towards the topics of physical pharmacy1	• Term project

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met.

Special Needs Section:

Tel: 00962-5-3903333 Extension: 4209

Location: Students Affairs Deanship/ Department of Student Welfare Services

Email: **amalomoush@hu.edu.jo**

amalomoush@staff.hu.edu.jo

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

On average, students need to spend 15 hrs of study and preparation weekly. At the beginning of the lectures, be on time and don't leave before the end of the lecture without an accepted excuse. If you missed a class, it is your responsibility to find out about any announcements or assignments you have missed. For any clarification, please communicate your instructor at her posted office hours or by appointment. Listen well to the lecture, if you have a question, ask your instructor. You will find the course material at the course team after the lecture.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**

- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fail to attend an exam, class project, or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus

Assessment	Grade Weighting	Deadline Assessment
First exam	25%	TBA
Second exam	25%	TBA
Quizzes-Homework	10%	TBA
Final exam	40%	TBA

Description of Exams

Test questions will predominately come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. The exam will consist of a combination multiple-choice, short answer, match, true and false, calculation problems, and/or descriptive questions.

Homework: Will be given for the selected chapters, while the chapter in progress you are supposed to work on them continuously and submit in the announced date.

You are also expected to work on in-chapter examples, self-tests and representative number of end of chapter problems. The answers of self-tests and end of chapter exercises are given at the end of the book.

Quizzes: Announced quizzes will be given during or/and at the end of each chapter based upon the previous lectures.

No make-up exams, homework or quizzes will be given. Only documented absences will be considered as per HU guidelines.

Grades are not negotiable and are awarded according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Note: For Physical Pharmacy 2 sections with 2 lecture periods per week (S/T or M/W), one lecture period covers 1.5 lecture hours (80 minutes). The course content specifies the sections in chapters of the reference textbooks will be included in quizzes, homework and exams.

Chapter 15 **Interfacial phenomena**	**Week 1-2**	**4 lecture hours**
Surface and Interfacial Tensions		
Surface free energy		
Surface Active Agents		
Micellization		

HLB system			
Applications of surface active agents			
Measurement of Tensions			
Chapter 19	**Rheology**	**Week 3-4**	**4 lecture hours**
Pharmaceutical importance			
Types of flow			
Newtonian Systems			
Newton's Law of Flow			
Non-Newtonian Systems			
Thixotropy			
Anti-thixotropy			
Determination of Rheological Properties			
Chapter 11	**Diffusion**	**Week 5-6**	**3 lecture hours**
Pharmaceutical importance			
Fick's First Law of Diffusion			
Fick's Second Law of Diffusion			
Steady-state Diffusion			
Procedures and Apparatus For Assessing Drug Diffusion			
Diffusion driving forces			
Pharmaceutical importance			
Chapter 13	**Drug release and dissolution**	**Week 6-8**	**5 lecture hours**
Introduction			
Noyes and Whitney equation			
Hixson-Crowell Cube-Root Law			
Factors affecting dissolution			
Intrinsic dissolution rate			
Drug release from matrix			
The Higuchi model			
Biopharmaceutical classification system (BCS)			
Dissolution methods and Apparatus			
Biorelevant media			
Chapter 17+19	**Dispersed system**	**Week 9-11**	**6 lecture hours**
Classification			
Colloidal dispersions			
Properties of colloids			
Colloid stability			
Coarse dispersions			
Emulsions			
Suspensions			
Chapter 7	**Pharmaceutical polymers**	**Week 12**	**2 lecture hours**
Definitions			
Polymer properties			
General properties of polymer solution			
Interaction of polymers with solvents			
Water-soluble polymers			
Water-insoluble polymers			
Pharmaceutical applications of polymers			
Chapter 14	**Chemical kinetics and stability**	**Week 13-15**	**4 lecture hours**
Introduction			

Chemical decomposition of drugs			
Rates and orders of reactions			
Half-life and shelf life			
Determination of reaction order			
Complex reactions			
Factors influencing drug stability			
Stability testing			
Chapter 10	**Complexation and protein binding**	**Week 16**	**3 lecture hours**
Metal ion complexes			
Inclusion complexes			
Methods of analysis of complexes			
Protein binding			
University Exams		***Week 16***	

ASSESSMENT RUBRICS

Classroom Participation: Assessment Criteria					
Criteria	**Quality**				**Score**
	Excellent (4 points)	**Good (3 points)**	**Satisfactory (2 points)**	**Needs Improvement (1 points)**	
Degree to which student integrates course readings into classroom participation	- often cites from readings; - uses readings to support points; - often articulates "fit" of readings with topic at hand.	-occasionally cites from readings; - sometimes uses readings to support points; -occasionally articulates "fit" of readings with topic at hand .	-rarely able to cite from readings; - rarely uses readings to support points; - rarely articulates "fit" of readings with topic at hand	-unable to cite from readings; -cannot use readings to support points; cannot articulates "fit" of readings with topic at hand .	
Interaction / participation in classroom discussions	-always a willing participant, responds frequently to questions; - routinely volunteers point of view .	-often a willing participant, - responds occasionally to questions; - occasionally volunteers point of view .	-rarely a willing participant, - rarely able to respond to questions; - rarely volunteers point of view .	-never a willing participant., - never able to respond to questions; - never volunteers point of view .	
Interaction /participation in classroom learning activities	-always a willing participant; -acts appropriately during all role plays; - responds frequently to questions; - routinely volunteers point of view.	-often a willing participant; -acts appropriately during role plays; - responds occasionally to questions; -occasionally volunteers point of view.	-rarely a willing participant. -occasionally acts inappropriately during role plays; - rarely able to respond to direct questions; -rarely volunteers point of view .	-never a willing participant - often acts inappropriately during role plays;, - never able to respond to direct questions; - never volunteers point of view.	
Demonstration of professional attitude and demeanor	-always demonstrates commitment through thorough preparation; - always arrives on time; - often solicits instructors' perspective outside class.	- rarely unprepared; rarely arrives late; - occasionally solicits instructors' perspective outside class .	-often unprepared; occasionally arrives late; - rarely solicits instructors' perspective outside class .	-rarely prepared; - often arrives late; -never solicits instructors' perspective outside class	

Classroom Participation: Oral Presentation										
Element	**Excellent**			**Satisfactory**			**Needs Improvement**			**Points**
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Organization	▪ There is a logical sequence of information. ▪ Title slide and closing slide are included appropriately.			▪ There is some logical sequence of information. ▪ Title slide and closing slides are included.			▪ There is little or no logical sequence of information. ▪ Title slide and/ or closing slides are not included.			
Slide Design (text, colors, background, illustrations, size, titles, subtitles)	▪ Presentation is attractive and appealing to viewers.			▪ Presentation is somewhat appealing to viewers.			▪ Little to no attempt has been made to make presentation appealing to viewers.			
Content	▪ Presentation covers topic completely and in depth. ▪ Information is clear, appropriate, and accurate.			▪ Presentation includes some essential information. ▪ Some information is somewhat confusing, incorrect, or flawed.			▪ Presentation includes little essential information. ▪ Information is confusing, inaccurate, or flawed.			
Language	▪ Spelling, grammar, usage, and punctuation are accurate ▪ Fluent and effective			▪ There are minor problems in spelling, grammar, usage, and/or punctuation.			▪ There are persistent errors in spelling, grammar, usage, and/or punctuation. ▪ Less or not fluent and effective.			
Delivery	▪ Ideas were communicated with enthusiasm, proper voice projection and clear delivery. ▪ There was sufficient eye contact with audience. ▪ There were sufficient use of other non-verbal communication skills.			▪ There was some difficulty communicating ideas due to voice projection, lack of preparation, incomplete work, and/or insufficient eye contact. ▪ Insufficient use of non-verbal communication skills. ▪ Delivery pace is somewhat appropriate.			▪ There was great difficulty communicating ideas due to poor voice projection, lack of preparation, incomplete work, and/or little or no eye contact. ▪ No use of non verbal communication skills.			

	▪ Appropriate delivery pace was used.		▪ Inappropriate delivery pace was used.	
Interaction with Audience	▪ Answers to questions are coherent and complete. ▪ Answers demonstrate confidence and extensive knowledge.	▪ Most answers to questions are coherent and complete. ▪ Answers somehow demonstrate confidence and extensive knowledge.	▪ Answers to questions are neither coherent nor complete. ▪ Is tentative or unclear in responses.	
	Total Score (Y x 5/16) =			