



**Jordan University of Science and Technology**  
**Faculty of Pharmacy**  
**Pharmacy Department**

PHAR751 Advanced Physical Pharmacy - JNQF Level: 9

First Semester 2024-2025

**Course Catalog**

3 Credit Hours. This course covers the physical and chemical principles in drug formulation design, with emphasis on solubility, mass transport and interfacial phenomena.

**Teaching Method:** On Campus

**Text Book**

<b>Title</b>	Martin's Physical Pharmacy and Pharmaceutical Sciences
<b>Author(s)</b>	Patrick J. Sinko
<b>Edition</b>	6th Edition
<b>Short Name</b>	Ref # 1
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref # 2	Ionic Equilibria: a mathematical approach	J. N. Butler	1st Edition	
Ref # 3	Physical Chemistry of Surfaces	A. W. Adamson	6th Edition	
Ref # 4	Adsorption from Solutions of Nonelectrolytes	J. J. Kipling	1st Edition	
Ref # 5	Surfactants and Interfacial Phenomena	M.J. Rosen	2nd Edition	

**Instructor**

<b>Name</b>	<b>Prof. Khouloud Alkhamis</b>
<b>Office Location</b>	P2L1
<b>Office Hours</b>	
<b>Email</b>	khoul@just.edu.jo

**Class Schedule & Room**

Section 1:  
 Lecture Time: Sun, Tue, Thu : 09:30 - 10:30  
 Room: قاعة الندوات/صيدلة

**Tentative List of Topics Covered**

Weeks	Topic	References
Week 1	Solubility of nonelectrolytes: - Phase equilibria & the phase rule - Ideal & real solutions - Nonideal solutions	From Ref # 1
Week 2	Solubility of nonelectrolytes: - Extended Hildebrand solubility approach - Extended Hansen solubility approach	Original research papers and From Ref # 1
Week 3	Solubility of nonelectrolytes: - Solubility of nonelectrolytes in polar solvents - Solubility and partitioning	Original research papers and From Ref # 1
Week 4	Solubility of electrolytes: - Precipitation & solubility Product - Calculating the solubility of weak electrolytes as influenced by pH	From Ref # 2
Week 5	Diffusion: - Fick's first and second law of diffusion - Steady state diffusion	From Ref # 1
Week 6	Diffusion: Membrane models	Original research papers and From Ref # 1
Week 7	Diffusion: Matrix release systems	Original research papers and From Ref # 1
Week 8	Dissolution: - Diffusion vs. interfacial controlled systems.	Original research papers and From Ref # 1
Week 9	Dissolution: Particle dissolution models	Original research papers and From Ref # 1
Week 10	Measurement of surface and interfacial tensions	From Ref # 3
Week 11	Insoluble monolayers and the film balance	Original research papers and From Ref # 1
Week 12	Micellar behavior & solubilization	From Ref # 5
Week 13	Adsorption at solid interfaces - Adsorption of gases on solids	From Ref # 3
Week 14	Adsorption at solid interfaces - Adsorption form solutions	From Ref # 4

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Predict the solubility of nonelectrolytes in various solvents using the appropriate solubility model. [1PLO1.1][1L9K2, 1L9C1]	20%	
Explain why precipitate might form when two solutions are mixed together. [1PLO3.2][1L9K2, 1L9C1]	5%	
Evaluate the various factors affecting permeation and drug release. [1PLO3.3][1L9K2, 1L9S1, 1L9C1]	15%	
Differentiate between the various drug dissolution models. [1PLO1.1][1L9K3, 1L9S1, 1L9C1]	10%	
Explain the principle involved in determining surface tension. [1PLO3.2][1L9K2, 1L9S1, 1L9C1]	10%	
Inspect the various factors affecting micellar solubilization [1PLO3.2][1L9K2, 1L9S1, 1L9C3]	15%	
Categorize the adsorption on solid surfaces. [1PLO1.1][1L9K2, 1L9S1, 1L9C3]	13%	
Predict the adsorption parameters using the appropriate adsorption model. [1PLO3.2][1L9K2, 1L9S1, 1L9C3]	12%	

PLO1.1	PLO2.1	PLO3.2	PLO3.3	PLO2.2	PLO2.3	PLO2.4	PLO3.1	PLO3.4	PLO3.5	PLO3.6	PLO4.1	PLO4.2	PLO4.3	PLO4.4	PLO5.1	PLO-PT1.1	PLO-PT2.1	PLO-PT2.2	PLO-PT3.1
43		42	15																

Relationship to NQF Outcomes (Out of 100%)				
L9K2	L9K3	L9S1	L9C1	L9C3
34.17	3.33	25	24.17	13.33

Evaluation	
Assessment Tool	Weight
First	25%
Second	25%
Final	50%

Policy	
Exams	The first and second incomplete exams need approval from the departments' heads. The final incomplete exams need approval from the dean.
Cheating	Prohibited; The commitment of the acts of cheating and deceit such as copying during examinations, altering examinations for re-grade, plagiarism of homework assignments, and in any way representing the work of others as your own is dishonest and will not be tolerated. Standard JUST policy will be applied.
Attendance	Excellent attendance is expected. Students who miss more than 20% of the classes will be dropped from the course as per JUST policy.

Date Printed: 2024-10-07