Course Description Form

1. Course Name:

Physical pharmacy I (Theoretical+ Practical)

2. Course Code:

Phind24_214-

3. Semester / Year:

First semester/2nd year

4. Description Preparation Date:

01/9/2024

5. Available Attendance Forms:

Students' signature on attendance sheet

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hours Theoretical + 2 hours Practical (75) /4 units

7. Course administrator's name

Theoretical

Dr. Ali Alazzo
Email: alialazzo@uomosul.edu.iq

Practical

Dr. Amina Mudhafar Al-Nima
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Dr. Rasha Khalid Shakir
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8. Course Objectives

Course Objectives	• Learning the physical principles that guide the pharmaceutical dosage form. • Understanding the basis of solubility, kinetics and drug delivery.

9. Teaching and Learning Strategies

Strategy	Lecturing Seminars Homework Practical laboratory demonstrations and team lab work

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3+2	1. Understand the nature of the intra- and intermolecular forces that are involved in stabilizing molecular and physical structures. 2. Understand the differences in these forces and their relevance to different types of molecules. 3.Appreciate the differences in the strengths of the intermolecular forces that are responsible for the stability of structures in	States of matter, binding forces between molecules.	Theoretical lectures. Laboratory experiments	Paper-based exams

		the different states of matter.			
2	3+2	1. Understand the properties of the different states of matter. 2. Describe the pharmaceutical relevance of the different states of matter to drug delivery systems by reference to specific examples given in the text boxes. 3. Describe the solid state, crystallinity, solvates, and polymorphism.	Ggases, liquids, solid crystalline matters;	Theoretical lectures. Laboratory experiments	Paper-based exams
3	3+2	1.Understand phase equilibria and phase transitions between the three main states of matter. 2. Understand the phase rule and its application to different systems containing multiple components.	phase equilibria and pl rule and Thermal analysi	Theoretical lectures. Laboratory experiments	Paper-based exams
4	3+2	1.Understand the theory of thermodynamics and its use for describing energy-related changes in reactions. 2.Understand the first law of thermodynamics and its use.	Thermodynamics, first l thermochemistry, sec law, third law, free ene function and applications	Theoretical lectures. Laboratory experiments	Paper-based exams
5	3+2	1.Understand the second law of thermodynamics and its use. 2.Understand the third law of thermodynamics and its use. 3.Define and calculate free energy functions and apply them to pharmaceutically relevant issues.	Thermodynamics, first l thermochemistry, sec law, third law, free ene function and applications	Theoretical lectures. Laboratory experiments.	Paper-based exams
6	3+2	1.Identify and describe the four colligative properties of nonelectrolytes in solution. 2.Understand the various types of pharmaceutical solutions.	Solutions of non-electrolytes, properties	Theoretical lectures. Laboratory experiments	Paper-based exams

7	3+2	1.Define ideal and real solutions using Raoult's and Henry's laws. 2.Calculate vapor pressure lowering, boiling point elevation, freezing point lowering, and pressure for solutions of nonelectrolytes.	ideal and real colligative properties, molecular weight determination	Theoretical lectures. Laboratory experiments	Paper-based exams
8	**Mid-term exam**				
9	3+2	1.Understand the important properties of solutions of electrolytes. 2.Calculate the conductance of solutions, the equivalent conductance, and the equivalent conductance of electrolytes. 3.Apply the Arrhenius theory of electrolytic dissociation.	Solution of electrolytes, properties	Theoretical lectures. Laboratory experiments.	Paper-based exams
10	3+2	1.Calculate ionic strength. 2.Calculate osmotic coefficients, osmolality, and osmolarity. 3.Understand the differences between osmolality and osmolarity.	Ionic strength, Debye-Huchle theory, coefficie for expressing colligativ properties	Theoretical lectures. Laboratory experiments	Paper-based exams
11	3+2	1.Describe the Br¨onsted–Lowry and Lewis electronic theories. 2.Understand the concepts of acid–base equilibria and the ionization of weak acids and weak bases.	Ionic equilibria, modern theories of acids, bases a salts, acid-base equilibri	Theoretical lectures. Laboratory experiments	Paper-based exams
12	3+2	1.Calculate dissociation constants Ka and Kb and understand the relationship between Ka and Kb. 2.Understand the concepts of pH, pK, and pOH and the relationship between hydrogen ion concentration and pH.	calculation of pH, acidit constants, the effect of i strength and free energy	Theoretical lectures. Laboratory experiments	Paper-based exams
13	3+2	1.Understand the common ion effect. 2.Discuss the factors influencing the pH of buffer solutions.	Buffered and isotonic solutions: Buffer equatio buffer capacity	Theoretical lectures. Laboratory experiments	Paper-based exams

14	3+2	1.Describe the concept of tonicity and its importance in pharmaceutical systems. 2.Calculate solution tonicity and tonicity adjustments.	isotonic solutions	Theoretical lectures. Laboratory experiments	Paper-based exams
15	**Students' seminars**				

11. Course Evaluation

- 20 M Theoretical assessment;
  (paper-based mid-term exam + quiz + attendance + seminar)
- 20 M practical assessment (attendance + quiz + practice)
- 60 M paper-based theoretical final exam

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  Total 100 M

12. Learning and Teaching Resources

Required textbooks	1- Alfred Martin et al, Physical Pharmacy,6th edition,2010. 2- Laboratory Manual for Practical Physical pharmacy adopted by the department.
Main references (sources)	1- **Physicochemical Principles of Pharmacy** Alexander Taylor Florence and David Attwood. 2- **Fast track: Physical Pharmacy** by Alexander Tay Florence and David Attwood.
Electronic References, Websites	