# Course Description Form

1. Course Name:

Physical pharmacy II (Theoretical+ Practical)

2. Course Code:

Phind24_2210-

3. Semester / Year:

Second semester/2nd year

4. Description Preparation Date:

15/1/2025

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
Email: amnah.mudhafar@uomosul.edu.iq
Dr. Rasha Khalid Shakir
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8. Course Objectives

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

9. Teaching and Learning Strategies

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| **Strategy** | Lecturing<br>Seminars<br>Homework<br>Practical laboratory demonstrations and team lab work |

10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
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| 1 | 3+2 | Define saturated solution, solubility, and unsaturated solution. Describe and give examples of polar, nonpolar, and semipolar solvents. | Solubility and distribution phenomena, solvent-solute interactions, solubility of gases in liquids, | Theoretical lectures. Laboratory experiments | Paper-based exams |
| 2 | 3+2 | Define complete and partial miscibility. Understand the factors controlling the solubility of weak electrolytes. | Solubility of liquids liquids, solubility of i ionic solids in liquids, | Theoretical lectures. Laboratory experiments | Paper-based exams |
| 3 | 3+2 | Describe what a distribution coefficient and partition | distribution of sol between immisc solvents. | Theoretical lectures. | Paper-based exams |

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| | | coefficient are and their importance in pharmaceutical systems. | | Laboratory experiments | |
| 4 | 3+2 | Define reaction rate, reaction order, and molecularity. Understand and apply apparent zero-order kinetics to the practice of pharmacy. Calculate half-life and shelf life of pharmaceutical products and drugs. | Chemical kinetics stability, rate and order reactions, | Theoretical lectures. Laboratory experiments | Paper-based exams |
| 5 | 3+2 | Describe the influence of temperature, ionic strength, solvent, pH, and dielectric constant on reaction rates. | Influence of temperature other factors on react rate | Theoretical lectures. Laboratory experiments. | Paper-based exams |
| 6 | 3+2 | Calculate the increase in rate constant as a function of temperature. Describe the factors that influence solid-state chemical kinetics. | Decomposition of medicinal agents and accelerated stability analysis. | Theoretical lectures. Laboratory experiments | Paper-based exams |
| 7 | 3+2 | Differentiate among different types of interfaces and describe relevant examples in the pharmaceutical sciences. Understand the terms surface tension and interfacial tension and their application in pharmaceutical sciences. | Interfacial phenomena | Theoretical lectures. Laboratory experiments | Paper-based exams |
| 8 | **Mid-term exam** | | | | |
| 9 | 3+2 | Calculate surface and interface tensions, surface free energy, its changes, work of cohesion and adhesion, and spreading coefficient for different types of interfaces. | Electric properties of interfaces, spreading coefficient | Theoretical lectures. Laboratory experiments. | Paper-based exams |
| 10 | 3+2 | Understand the mechanisms of adsorption on liquid and solid interfaces. Classify surface-active agents and appreciate their applications | Adsorption at liquid interfaces, surface-active agents | Theoretical lectures. Laboratory experiments | Paper-based exams |

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| | | in pharmacy. | | | |
| 11 | 3+2 | Differentiate between different types of colloidal systems and their main characteristics. | Colloids, dispersed syste and its pharmaceutical application, types of colloidal systems | Theoretical lectures.<br><br>Laboratory experiments | Paper-based exams |
| 12 | 3+2 | Appreciate the major kinetic properties of colloids.<br>Understand the main electrical properties of colloids and their application for the stability, sensitization, and protective action of colloids. | kinetic properties, diffus zeta potential, solubiliza of colloidal systems | Theoretical lectures.<br><br>Laboratory experiments | Paper-based exams |
| 13 | 3+2 | Define rheology, provide examples of fluid pharmaceutical products exhibiting various rheologic behaviors, and describe the application of rheology in the pharmaceutical sciences and practice of pharmacy.<br>Differentiate flow properties and corresponding rheograms between Newtonian and non-Newtonian materials. | Rheology, Newtonian ar non-newtonian systems, | Theoretical lectures.<br><br>Laboratory experiments | Paper-based exams |
| 14 | 3+2 | Understand and calculate the effects of temperature on viscosity and recognize similarities between viscous flow and diffusion relative to temperature.<br>Recognize and identify specific rheologic behaviors with their corresponding rheograms.<br>. | Thixotropy, determinatic of thixotropy. | Theoretical lectures.<br><br>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

Total 100 M

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| 12. Learning and Teaching Resources | |
| Required textbooks | 1- Alfred Martin et al, Physical Pharmacy,6th edition,2010.<br>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.<br>2- **Fast track: Physical Pharmacy** by Alexander Tay Florence and David Attwood. |