University of Jordan
Faculty of Pharmacy
Department of Pharmaceutics and Pharmaceutical Technology
Second Semester

Course Title: Advanced Physical Pharmacy
Prerequisite(s): First University degree in Pharmacy

Teaching Methods:

1. Lectures
2. Assignments, reports and Projects
3. Case studies

Tests and Evaluations:

1) Exams: 80%
2) **Projects and Assignments:** 20%
To be presented in the presence of the lecturer, the students.

Course Content and Schedule:

The course is 3 credit hours, each lecture is 1.5 hour.

Lecture 1	Partial differentiation
Lecture 2	Energy, heat and work.
Lecture 3	The 1st law of thermodynamics, isothermal, adiabatic and reversible processes.
Lecture 4	Concepts of work, enthalpy, heat capacity and heats of reactions.
Lecture 5	The 2nd law of thermodynamics, entropy and disorder.
Lecture 6	The 3rd law of thermodynamics and free energy.
Lecture 7	Fugacity, activity, chemical potential and other partial molar quantities
Lecture 8	Discussion of a related published research article.
Lecture 9	Discussion of a related published research article.
Lecture 10	Types of surfactants and surface activity concept.
Lecture 11	Phase behavior and different types of phase diagrams of the surfactants systems.
Lecture 12	Micellization, factors affecting CMC, solubilization.
Lecture 13	Discussion of a related published research article.
Lecture 14	Mid Term Exam.
Lecture 15	Surface Activity. Adsorption at solid surface and types of adsorption isotherms.
Lecture 16	Application of the adsorption in the determination of the solid particle dimensions, problem solving.
Lecture 17	Adsorption at the liquid surface. The surface excess and

	the surface pressure.
Lecture 18	Discussion of a related published research article.
Lecture 19	Colloidal stability, zeta and surface potentials, gold number, and the coagulation concentration
Lecture 20	Classical and extended DLVO theory.
Lecture 21	Discussion of a related published research article.
Lecture 22	Discussion of a related published research article.
Lecture 23	The concept of the rheology. The relation between applied force and response in liquids, solids and semisolids, examples of the flow behavior, units of viscosity.
Lecture 24	the different types of the flow, the concept of thixotropy and other complex flow types.
Lecture 25	The concept of the viscoelasticity, the different mechanical models used to describe the viscoelastic behavior of the substances.
Lecture 26	Viscosity measurements and different modes of the rheometer operation.
Lecture 27	The complex viscosity, the storage and loss moduli.
Lecture 28	Discussion of a related published research article. (the creep test)
Lecture 29	Discussion of a related published research article. (suspension stability through the zeta potential and complex viscosity data).
Lecture 30	Discussion of a related published research article. (the storage and loss modulus of polymers)

References:

1. Published articles related to the discussed topics.
2. Surfactant Systems, D. attwood and A.T.Florence. 1983, Chapman and Hall.
3. Physical Pharmacy, A. Martin, P. Bustamante and A.H.C. Chun, 4th Edition, 1993, Lea and Febiger.
4. Thermodynamics of Pharmaceutical Systems, Kenneth A. Connors, 2002, Wiley International.
5. Physico-Chemical Principles in Pharmacy, A.T Florence and D. Attwood, 1985, McMillan Publishing, London.
6. Pharmaceutics: The Science of Dosage Form Design, Ed. M.E. Aulton, 1988, ELBS, London.
7. Bently's Textbook of Pharmaceutics, E. A. Rawlins, 8th Edition, 1984, ELBS, London.
8. Pharmaceutical Dosage Forms-Disperse Systems, Volumes 1&2. Ed. Herbert A. Lieberman, Martin M. Rieger and Gilbert S. Banker. 1988. Marcel Dekker, INC. New York and Basel.