



كلية الصيدلة جامعة الزيتونة الأردنية
Faculty of Pharmacy
Al-Zaytoonah University of Jordan

" نحو تعليم صيدلاني متميز "
Toward Excellence in Pharmaceutical
Education

جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan
كلية الصيدلة
Faculty of Pharmacy



"Tradition and Quality"

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|---|----------------|
| Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department | QF02/0408-3.0E |
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|------------------------|----------|----------------------------|-------------------|
| Faculty | Pharmacy | Department | Pharmacy |
| Course number | 0201111 | Course title | Physical pharmacy |
| Number of credit hours | 2 | Pre-requisite/co-requisite | General Chemistry |

Brief course description

Physical pharmacy is a general chemistry course for students with a strong background in chemistry and mathematics. The course will cover selected general chemistry topics important for higher level pharmacy courses. These include the properties of gases, liquids, and solids; solutions; reaction kinetics; chemical equilibria and an introduction to thermodynamics.

| Course goals and learning outcomes | |
|------------------------------------|---|
| Goal 1 | Understand the physical properties of gas, liquid and solid. |
| Learning outcomes | 1.1 To make student able to carry the gas laws and their application. 1.2 Perform calculations involving gas reactions. 1.3 To enhance the student abilities of subjects related to basic knowledge in intermolecular forces and properties of liquids. 1.4 Know the principle of phase changes and phase diagram |
| Goal 2 | Understand the physical properties of solutions. |
| Learning outcomes | 2.1 Study the properties of solutions and calculate the solution concentration calculations 2.2 Study the colligative properties of the solutions and their calculation. |
| Goal 3 | Understand how to determine the reaction rate. |
| Learning outcomes | 3.1 Know the fundamentals of chemical kinetics, rate law, reaction order, and rate-temperature relationship. 3.2 Understand the reaction mechanism and how the catalyst work |
| Goal 4 | Understand the dynamic equilibrium involving reaction, and explore the connection between energy and the extent of a reaction |
| Learning outcomes | 4.1 Know the fundamentals of chemical equilibrium reaction and their applications and calculations. 4.2 Know the fundamentals of chemical thermodynamic. |
| Textbook | Chemistry Chemistry , The Central Science , Brown , Le May , Bursten, Prentice Hall , 12 th Edition (2012). |
| Supplementary references | 1- Physical Pharmacy, Alfred Martin, Waverly International, 4 th edition.1993. 2- Chemistry, Chang, McGraw Hill, 9 th edition, 2007. 3- Chemistry, Zumdahl and Zumdahl, Houghton Mifflin, 7 th edition, 2007 4- Chemistry, The Molecular Nature of Matter and Change, Silberberg, McGraw Hill, 3ed edition, 2003. 5- General chemistry, Ebbing and Gammon, Houghton Mifflin , 9 th edition. |



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| Course timeline | | | | |
|-----------------|-----------------|---|------------------|-------|
| Week | Number of hours | Course topics | Pages (textbook) | Notes |
| 01 | 1 | Characteristic of gas, the gas law | 394 | |
| | 1 | The ideal gas law, gas mixture and partial pressure | 402 | |
| 02 | 1 | The kinetic molecular theory | 414 | |
| | 1 | Molecular effusion and diffusion Real gases | 417 | |
| 03 | 1 | A molecular comparison of gases liquids and solids, | 438 | |
| | 1 | Intermolecular forces of liquids. | 439 | |
| 04 | 1 | Some properties of liquids, vapor pressure. | 447 | |
| | 1 | Phase Changes. | 449 | |
| 05 | 1 | Phase diagrams. | 456 | |
| | 1 | Structures of solids, bonding in solid | 458 | |
| 06 | 1 | Properties of solutions: The solution process. | 528 | |
| | 1 | Saturated solutions and solubility. First exam | 534 | |
| 07 | 1 | Factors affecting solubility. | 535 | |
| | 1 | Ways of expressing concentration. | 542 | |
| 08 | 1 | Colligative properties. | 546 | |
| | 1 | Non electrolytes, colloids. | 556 | |
| 09 | 1 | Chemical Kinetics: Factors that affect reaction rates. Reaction rates. | 574 | |
| | 1 | The rate Law | 580 | |
| 10 | 1 | Concentration and Rate | 583 | |
| | 1 | The Change of Concentration with Time. | 585 | |
| 11 | 1 | Temperature and Rate. | 591 | |
| | 1 | Reaction Mechanisms. Catalysis | 597 | |
| 12 | 1 | Chemical Equilibrium: The Concept of Equilibrium. The equilibrium constant. Heterogeneous equilibrium | 628 | |
| | 1 | Second exam | | |



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| 13 | 1 | Calculating equilibrium constant. | 641 | |
| | 1 | Applications of equilibrium constant .Le Chätelier's principle | 648 | |
| 14 | 1 | Chemical thermodynamics: Spontaneous processes. | 802 | |
| | 1 | Entropy and the Second Law of Thermodynamics. | 806 | |
| 15 | 1 | The molecular interpretation of entropy. | 809 | |
| | 1 | Entropy changes in chemical reactions | 817 | |
| 16 | 1 | Gibb's free energy. Free energy and temperature. | 819 | |
| | 1 | Free energy and the equilibrium constant. Final exam | 824 | |

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| Theoretical course evaluation methods and weight | First exam 25% Second exam 25% Final exam 50% | Practical (clinical) course evaluation methods | Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50% |
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| Approved by head of department | | Date of approval | |
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Extra information (to be updated every semester by corresponding faculty member)

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|---------------------------------|-------------------------|----------------------|--------------------------|
| Name of teacher | Dr. Mohammad Kamal Harb | Office Number | 413 |
| Phone number (extension) | 293 | Email | Mohammad.harb@zuj.edu.jo |