

University of Petra

Faculty of Art & Science

Department of Chemistry



جامعة البترا

كلية الآداب والعلوم

قسم الكيمياء

### Course Syllabus

Year: 2019-2020

Semester: First

Course No.	Course Title	Prerequisite	Co-requisite	Credit Hours/ ECTS: European Credit Transfer System
101323	Physical Chemistry Lab (1)	101321	None	2/4

Instructor's Name	E-mail	Office No.	Office ext.	Office Hours
Layla Qaddoura	lqaddoura@uop.edu.jo	7203	7203	Sun., Tue., Thu. 12-13, Wed. 9-11

<b>Course Description</b>	This practical course is meant to build up knowledge and skills of students in basic physical chemistry, understanding the concepts of some topics as: distribution between two immiscible phases, adsorption, density measurements, solubility, calorimetry, spectrophotometry, and thermochemistry. This is achieved through 10 experiments that should be performed effectively & safely, using laboratory equipments and standard scientific procedures.
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### Course Objectives

1. To instill in students a sense of enthusiasm for physical chemistry, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying.
2. To develop in students the ability to apply their chemical knowledge and skills to the solution of theoretical and practical problems in physical chemistry.
3. To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of physical chemistry or multi-disciplinary areas involving physical chemistry.
4. To generate in students an appreciation of the importance of physical chemistry in an industrial, economic, environmental and social context.
5. To insure that students acquire the knowledge of basic physical chemistry necessary for understanding other chemistry courses.

### Course Intended Learning Outcomes (ILOs) and their Alignment with Program ILOs:

Upon successful completion of this course, students are expected to achieve the following learning outcomes:

Course ILOs	Program ILOs	Teaching and Learning Method	Assessment Method
<b>Knowledge (K)</b>			
Demonstrate knowledge and understanding of essential facts, concepts, principles and theories, related to: Distribution phenomena, adsorption phenomena, density, heat of solution,	K1	Lecture by teacher, Instructions, Discussion in the	Exams: I, II, Lab reports,

calorimetry, equilibrium and spectrophotometry.		Lab.& Performing experiments.	Evaluation
<b>Intellectual Skills (I)</b>			
Perform calculations related to experiments covered in the syllabus. This may include sketching graphs of "first degree equations" and solving algebraic equations for an unknown quantity.	I1	Lecture by teacher, Instructions, Discussion in the Lab.& Performing experiments.	Exams: I,II, Lab reports, Evaluation
Interpret experimental data through critical thinking and draw reasonable conclusions.	I2		
<b>Practical skills (P)</b>			
Use laboratory equipments and standard procedures effectively & safely with the ability to recognize hazards, and to manage chemicals, including chemical wastes.	P1	Lecture by teacher, Instructions, Discussion in the Lab.& Performing experiments.	Lab reports, Evaluation
Perform accurate measurements using proper techniques to insure obtaining reliable data and accurate results that maintain quality assurance.	P2		
Write scientific reports that collect and organize data.	P3		
<b>Transferable Skills (T)</b>			
Communicate efficiently and effectively with the staff members and students. This includes: ability to work in a team, manage time effectively, gain knowledge of ethics and respect for others.	T1	Lecture by teacher, Instructions, Discussion in the Lab.& Performing experiments.	Lab reports, Evaluation
Acquire skills for creation, problem solving & decision making, which develop motivation and learning skills for lifelong learning.	T2		

### **Assessment Methods:**

Assessment method	Grade	Comments
Midterm Exam	20	-Every student should bring his own scientific calculator when entering the exam hall. Calculators are not allowed to be exchanged between students during exam.
Reports	30	
Evaluation	10	
Practical quiz	10	- Every student should also bring a graph paper, a 30 cm ruler, a pencil and an eraser when entering the exam hall.
Final Exam	30	-Students are not allowed to carry their mobiles inside exam lab.
<b>Total</b>	<b>100</b>	

### **Learning References:**

1- **Textbook:** Practical Physical Chemistry Manual For Chemistry 101323, by: Layla Qaddoura, First edition, February 2006.

2- **Other Resources:** a lecture room with data show facility.

### **Course Schedule:**

Week	Topic	Topic Details	Course ILOs	Reference
1	Safety rules	Explain safety and laboratory rules that the student will deal with.	All	
2	Distribution of a solute between 2 immiscible liquids	To determine the equilibrium constant for the reaction of iodine with iodide ion.	All	
3	Distribution of acetic	To determine the distribution coefficient of	All	

	acid between water and CCl <sub>4</sub>	acetic acid between water and CCl <sub>4</sub> .		Practical Physical Chemistry Manual (101323)
4	Determination of equilibrium adsorption of an organic acid by activated carbon in aqueous medium	To study the adsorption of acetic acid on activated charcoal.	All	
5	Density of liquids and solutions	To determine the densities of sodium chloride solutions at 298 K.	All	
6	Partial molar volume	To determine the partial molar volumes of sodium chloride solutions as a function of concentration from density measurements at 298 K.	All	
7	Heat of solution using solubility	To determine the heat of solution from measurements of solubility of benzoic acid at several different temperatures.	All	
8	Heat of solution using calorimetry	To determine the heat of solution by a simplified calorimetric procedure.	All	
9	Bomb calorimetry	To determine the heat of combustion of naphthalene using bomb calorimeter.	All	
10	Indicator constant by spectrophotometry	To obtain the indicator constant of bromothymol blue by measuring its absorbance in buffer solutions of various pH values.	All	
11	Spectrophotometric Determination of a 2 compound system	To determine the concentration of Co <sup>2+</sup> and Cr <sup>3+</sup> in a mixture of both.	All	

### Course Policies<sup>1</sup>

- Attendance Policy: University regulations apply to attendance.
- Academic Honesty: Academic dishonesty is an unacceptable mode of conduct, and will not be tolerated in any form at University of Petra. All persons involved in academic dishonesty and plagiarism in any form will be disciplined in accordance with University rules and regulations.

Approved by	Name
Head of Department	Dr. Abd el Monem Twaiq
Faculty Dean	Prof. Rami Abdel-Rahem

<sup>1</sup> Additional information may be added in this section according to the nature of the course.