Course Syllabus
Faculty of Arts and Science
Department: Chemistry

Academic Year: 2022/ 2023 Semester: First

Course Title :	Physical Chemistry lab1
Course No. :	1722211
Prerequisite :	1722210
Concurrent :	1722210
Department :	Chemistry
Coordinator :	Dr. Dima Khater
Mode of Instruction	**On Campus** 3-hour in class

*** Instructor:**

Lecturer	Office Phone	Room No.	Office Hours	E-mail
Dima Khater_	1283	224	Sun-Tue-Thur:9-10 Mon-Wed: 10-11	d_khater@asu.edu.jo

Course Description

This course introduces experiments related to thermochemistry, thermodynamics, solution equilibria, phase diagrams, and chemical equilibrium to reinforce the material, as learned from physical chemistry 1. Attendance is expected and students are responsible for being denied from the final exam if the absence exceeds 15% of the lecture sessions.

Intended Learning Outcomes

Upon the completion of the course, this module should lead to the following learning outcomes:

A. Knowledge and Understanding (Student should):

A1 understand the general procedures for conducting some experiments related to physical chemistry topics.

A2 know how to identify organize experimental data and identifying laboratory equipment.

B. Cognitive and Intellectual Skills (Student should):

B1 practice the procedures for operating common advanced laboratory equipment and instruments (e.g. spectrophotometer, pH meter).

C. Subject Specific Skills (Student should):

C1 to emphasize concepts of thermochemistry, thermodynamics, solution equilibria, phase diagrams, and chemical equilibrium.

C2 to attain a depth of understanding of fundamentals and a reasonable competence in dealing with physical chemistry problems.

D. Transferable Skills (Student should):

D1 test the topics covered, the emphasis on chemical calculations, and the mathematical formulation of principles.

Program Learning Outcomes (PLOs):

1.1	Describe the fundamentals of chemistry including structure, reactivity, and properties of chemical substances, the different situations of reaction, and the states of matter.
1.2	Construct essential facts, principles, and theories across the principal areas of physical chemistry.
2.3	Analyze chemical and spectral data to identify and confirm chemical structures and chemical composition.
2.5	Solve scientific problems using different mechanisms and procedures.
3.3	Select appropriate techniques and procedures for chemical synthesis and analysis.
4.3	Interpret data derived from laboratory observations and measurements in terms of their significance and the theory underlying them.
5.1	Assemble and use properly chemistry experimental setups
5.2	Perform correctly quantitative measurements requiring accurate and precise manipulation

Course Learning Outcomes Alignment Matrix						
	A1	**A2**	**B1**	**C1**	**C2**	**D1**
1.1	√					
1.2		√				
2.3					√	

2.5				√		
3.3			√			
4.3					√	
5.1			√			
5.2						√

Course Contents and Schedule

Week	Day and Date	Topics to be covered	Method of instruction	CLOSE	PLOs
1	Wed. 19/10/2022	Introduction and safety rules	In-class lecture	**A1**	**1.1**
2	Wed. 26/10/2022	Specific heat capacity of an unknown metal	In-class lecture	**A1** **A2** **C1** **B1** **C2** **D1**	**1.1** **1.2** **2.5** **3.3** **4.3** **5.1**
3	Wed. 2/11/2022	Molar mass of unknown from freezing point depression	In-class lecture	**A1** **A2** **C1** **B1** **C2** **D1**	**1.1** **1.2** **2.5** **3.3** **4.3** **5.1**
4	Wed. 9/11/2022	Enthalpy of Formation of Magnesium Oxide	In-class lecture	**A1** **A2** **C1** **B1** **C2** **D1**	**1.1** **1.2** **2.5** **3.3** **4.3** **5.1**
5	Wed. 16/11/2022	Determination of Heat of the solution by solubility method	In-class lecture	**A1** **A2** **B1** **C1** **C2** **D1**	**1.1** **1.2** **2.5** **3.3** **4.3** **5.1** **5.2**
6	Wed. 23/11/2022	Determination of an Equilibrium Constant for the hydrolysis of ethyl acetate	In-class lecture	**A1** **A2** **B1** **C1**	**1.1** **1.2** **2.5** **3.3**

				C2 D1	4.3 5.1 5.2
7	Wed. 30/11/2022	Determination of an Equilibrium Constant by spectrophotometer	In-class lecture	A1 A2 B1 C1	1.1 1.2 2.5 3.3 5.1
8.	Wed. 7/12/2022	Midterm exam			
9	Wed. 14/12/2022	Determination of Distribution Coefficient of I_2 and Stability Constant of I_3^- Complex	In-class lecture	A1 A2 B1 C1 D1	1.1 1.2 2.5 3.3 5.1 5.2
10	Wed. 21/12/2022	Partial Molar Volume	In-class lecture	A1 A2 B1	1.1 1.2 3.3 5.1
11	Wed. 28/12/2022	Binary Water - Phenol Mixture	In-class lecture	A1 A2 B1 C1 C2	1.1 1.2 2.5 3.3 4.3 5.1
12	Wed. 4/1/2023	Ternary Systems	In-class lecture	A1 A2 B1 C2	1.1 1.2 3.3 4.3 5.1
13	Wed. 11/1/2023	Determination of the Equilibrium Constant for Indicator	In-class lecture	A1 A2 B1 C2 D1	1.1 1.2 3.3 4.3 5.1 5.2
14	Wed. 18/1/2023	**Final EXAM**			

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Grading Plan and Assessment Tools

Assessment Tools	Weights	Due date
Mid-term	30	TBA
Assignments	-	
Quizzes	-	
Interactive lectures	-	
Group Work	-	
Presentation	-	
Reports	20	TBA
Project	-	
Case-Study	-	
Final Exam	50	TBA

Supplementary Reading

- **Textbook:**

A. Albawab; F. Odeh; A. Bozeya, Experimental Physical Chemistry I, 2nd ed., 2015, Jordan University Press.

- **References:**

P. W. Atkins, and J. de Paula, Physical Chemistry, 10th ed., OUP, 2014.

"T. Engel, P. Reid, Physical Chemistry, 3rd ed., Pearson Education, Inc., 2013.

K. J. Laidler, J. H. Meiser, and B. C. Sanctuary, Physical Chemistry, 4th ed., Houghton Mifflin Company, 2003.
I. N Levine, Physical Chemistry, 6th ed., the McGraw-Hill Companies, 2009.

P. Shoemaker, C. W. Garland, and J. W. Nibler, Experiments in .A Physical Chemistry, 8th ed., the McGraw-Hill Companies, 2011

F. Daniels, J. W. Williams, P. Bender, R. A. Alberty, C. D. Cornwell, and J. E. Harriman, Experimental Physical Chemistry, 7th ed., McGraw-Hill, 1970

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Subject Coordinator	**Dr. Dima Khater**	**Signature:**	----------
Head of Curriculum Committee	**Dr. Hussam Miqdad**	**Signature:**	----------
Department Head	**Dr. Hussam Miqdad**	**Signature:**	----------
Faculty Dean	**Dr. Hadeel Ali Saed**	**Signature:**	----------

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- Department Head.
- Head of Curriculum Committee.
- Course File.