



**UNIVERSITY OF JORDAN**  
**Faculty of Engineering & Technology**  
**Chemical Engineering Department**

**0905324 Physical Chemistry**  
**First Semester 2018/2019**

<b>Course Catalog</b>	
<b>Compulsory, 3 Credit hours (3 hr lectures including problem solving sessions)</b>	
Review of gas behavior and thermodynamics. Chemical equilibrium in solutions. Heterogeneous equilibrium. Shifts of equilibrium and its dependence on temperature and pressure. Electrolyte solutions, weak and strong electrolytes, ion conductivity and activity coefficients. Electrochemical cells. Chemical kinetics, rate of reaction. Introduction to surface chemistry and colloids.	
<b>Prerequisite</b>	0303101 General Chemistry (1)

<b>Textbook</b>	
Atkins, P. and de Paula, J. “ <i>Physical Chemistry</i> ”, Oxford University Press, 11 <sup>th</sup> edition, 2017.	
<b>References</b>	
<b>Books</b>	Laidler, K. J., Meiser, J. and Sanctuary, B. C. “Physical Chemistry”, Thomson Brooks / Cole, 4 <sup>th</sup> Edition, 2003.
<b>Journals</b>	---
<b>Internet links</b>	<a href="http://global.oup.com/uk/orc/chemistry/pchem9e/">http://global.oup.com/uk/orc/chemistry/pchem9e/</a> <a href="http://bcs.whfreeman.com/pchem9e/default.asp#t_533120">http://bcs.whfreeman.com/pchem9e/default.asp#t_533120</a>

<b>Instructor</b>	
Name	Prof. Ahmad M. AbuYaghi
Office Location	Eng. Building, 2 <sup>nd</sup> Floor
Office Phone	06 535 5000 Ext: 22906
E-mail	<a href="mailto:ahmad.ay55@gmail.com">ahmad.ay55@gmail.com</a> <a href="mailto:abuyaghi@ju.edu.jo">abuyaghi@ju.edu.jo</a>

<b>Class Schedule &amp; Room</b>	
Lecture Time:	Su Tu Th 8:00-9:00
Room:	Tempus Room
<b>Office Hours</b>	
9-10 Su Tu Th and 11-12 Mon Wed	

<b>Mapping of Course Objectives to Program Outcomes</b>	
1.	Explore the scope of physical chemistry and its importance and applications in chemical engineering education (O1)
2.	Develop a fundamental understanding of the fundamental principles of physical chemistry as well as problem solving ability based on relevant laws, mathematical equations and graphical relationships (O1)
3.	Describe and explain the observed experimental behavior of matter in the light of theory (O1)

Relationship to ABET Criterion 3 *							(score out of 5)
O1	O2	O3	O4	O5	O6	O7	
X							

Relationship to Program Educational Objectives \*\*

PEO1	PEO2	PEO3	PEO4
√		√	

<b>Topics Covered</b>		<b>Chapters in Textbook</b>
1. Review of gas behavior from both theory and empirical viewpoints		Chapter 1
2. Review of thermodynamics laws with focus on thermochemistry		Chapter 2,3
3. Chemical equilibrium for homogenous and heterogeneous systems		Chapter 6
4. Chemical kinetics and reaction rates		Chapter 21
5. Solutions of electrolytes and electrochemical cells		Chapter 23
6. Introduction to surface chemistry: surface tension, adsorption, colloidal systems		Chapter 23

<b>Evaluation</b>		
<b>Assessment Tool</b>	<b>Expected Due Date</b>	<b>Weight</b>
Classwork / Problem Solving	To be announced	20%
First Exam	According to Department schedule	20 %
Second Exam	According to Department schedule	20%
Final Exam	According to Registration and Department schedule	40 %

<b>ABET Category Content</b>	
<b>Engineering Science</b>	100% (3 Credits)
<b>Engineering Design</b>	---

Updated by Prof. Dr. Ahmad M. AbuYaghi

Sept., 10<sup>th</sup>, 2018

**\*An ability to:**

- O1:** Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- O2:** Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- O3:** Communicate effectively with a range of audiences.
- O4:** Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- O5:** Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- O6:** Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- O7:** Acquire and apply new knowledge as needed, using appropriate learning strategies.

**\*\*Program Educational Objectives:**

Graduates of the chemical engineering program are expected within a few years of graduation to :

- 1) Demonstrate their ability to integrate and apply knowledge, skills, professional ethics and leadership at national, regional and global levels.
- 2) Demonstrate their ability to work successfully both independently and in team functioning effectively as responsible professionals.
- 3) Establish themselves as distinguished professionals in industry, academia and other related fields.
- 4) Develop themselves in post-graduate studies in chemical engineering or allied fields.