

Course E-Syllabus

1	Course title	Physical Chemistry 1
2	Course number	0303241
3	Credit hours	3
	Contact hours (theory, practical)	(3, 0)
4	Prerequisites/corequisites	
5	Program title	Chemistry
6	Program code	3
7	Awarding institution	The University of Jordan
8	School	School of Science
9	Department	Department of Chemistry
10	Level of course	Second year
11	Year of study and semester (s)	2019/2020 Summer
12	Final Qualification	Bachelor's Degree
13	Other department (s) involved in teaching the course	No departments are involved in teaching the course
14	Language of Instruction	English
15	Teaching methodology	<input type="checkbox"/> Blended <input checked="" type="checkbox"/> Online
16	Electronic platform(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input checked="" type="checkbox"/> Others...by Gmail: chemiaphysical2020@gmail.com
17	Date of production/revision	2 nd Semester 2019/2020

18 Course Coordinator:

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19 Other instructors:

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20 Course Description:

The course covers the key concepts of one of three of the principal topics in first-year undergraduate physical chemistry: thermodynamics, kinetics and quantum mechanics. Thermodynamics and phases are explained in details over six chapters.

21 Course aims and outcomes:

A- Aims:

1. Develop a comprehensive understanding of the fundamental principles of physical chemistry.
2. Explain the fundamental principles of physical chemistry and their applications in Thermodynamics laws, Chemical Equilibrium, Phases and Solutions and Phase Equilibria.
3. Promote problem-solving skills by expressing important relationships in mathematical terms, and in applying mathematical techniques to the solution of relevant problems in the above fields.
4. Integrate the fundamental subjects learned with practical applications.

B- Intended Learning Outcomes (ILOs):

Upon successful completion of this course, students will be able to:

1. Understand thermodynamics in chemical systems
2. Describe phases and solve problems in that field.

22. Topic Outline and Schedule:

Week	Lecture	Topic	Teaching Methods*/platform	Evaluation Methods**	References
1	1.1	Introduction to Physical Chemistry	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	1.2	Introduction to Physical Chemistry	Synchronous lecturing/meeting	Homework	
	1.3	Introduction to Physical Chemistry	Synchronous lecturing/meeting	Assignments	
	1.4	Introduction to Physical Chemistry	Synchronous lecturing/meeting	Quiz	
2	2.1	The Nature of Physical Chemistry	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	2.2	The Nature of Physical Chemistry	Synchronous lecturing/meeting	Homework	
	2.3	The Kinetic Theory of Gases	Synchronous lecturing/meeting	Assignments	
	2.4	The Kinetic Theory of Gases	Synchronous lecturing/meeting	Quiz	
3	3.1	The First Law of Thermodynamics	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	3.2	Equilibrium states and reversibility,	Synchronous lecturing/meeting	Homework	
	3.3	energy, heat and work concepts	Synchronous lecturing/meeting	Assignments	
	3.4	thermochemistry, ideal gas relationships, real gases	Synchronous lecturing/meeting	Quiz	
4	4.1	The Second and Third Laws of Thermodynamics	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	4.2	The Carnot cycle, irreversible processes, entropy concept and entropy changes	Synchronous lecturing/meeting	Homework	
	4.3	third law of thermodynamics, equilibrium conditions	Synchronous lecturing/meeting	Assignments	
	4.4	Gibbs free energy, Maxwell relations, Gibbs-Helmholtz equation	Synchronous lecturing/meeting	Quiz	
5	5.1	Chemical Equilibrium	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston
	5.2	Equilibria involving ideal and non-ideal gases, solution equilibrium	Synchronous lecturing/meeting	Homework	

	5.3	heterogeneous equilibrium, tests of equilibrium,	Synchronous lecturing/meeting	Assignments	(2003)
	5.4	temperature dependence of equilibrium constants	Synchronous lecturing/meeting	Quiz	
6	6.1	Phases and Solutions	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	6.2	Phase recognition, vapor pressure relations, classification of phase transitions	Synchronous lecturing/meeting	Homework	
	6.3	Raoult's and Henry's laws,	Synchronous lecturing/meeting	Assignments	
	6.4	partial molar quantities, solution thermodynamics, colligative properties	Synchronous lecturing/meeting	Quiz	
7	7.1	Phase Equilibria	Synchronous lecturing/meeting	Homework	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	7.2	Equilibria between phases, one-component systems	Synchronous lecturing/meeting	Homework	
	7.3	binary systems involving vapor, condensed binary systems	Synchronous lecturing/meeting	Assignments	
	7.4	ternary systems	Synchronous lecturing/meeting	Quiz	
8	8.1	Solving problems from the text book	Synchronous lecturing/meeting	-	Physical Chemistry, 4 th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)
	8.2	Solving problems from the text book	Synchronous lecturing/meeting	-	
	8.3	Solving problems from the text book	Synchronous lecturing/meeting	-	
	8.4	Final Exam	In-Class	Exam	

- Teaching methods include: Synchronous lecturing/meeting; Asynchronous lecturing/meeting
- Evaluation methods include: Homework, Quiz, Exam, pre-lab quiz...etc

23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Quizzes	30	All topics	Through semester	Microsoft forms
Homework	10	All topics	Through semester	Gmail

Assignments	10	All topics	Through semester	Gmail
Final Exam	50	All topics	last	In-Class

24 Course Requirements (e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Students should have:
Computer, Internet connection and account on Microsoft Teams.

25 Course Policies:

A- Attendance policies:

- Students are expected to attend 100% of their lessons.
- Excused Absences are only allowed.
- Absence without explanation is subjected to university regulation.

B- Absences from exams and submitting assignments on time:

- Absences without written explanation are considered unexcused and subjected to university regulation.
- Late assignments submission are not allowed.

C- Health and safety procedures:

- Students and instructors are subjected to the general health and safety conditions applicable at the university, under penalty of responsibility.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

- Cheating is not allowed and penalty is set out in university regulation.

E- Grading policy:

- 30% Quizzes
- 10% Homework,
- 10% Assignments,
- 50% Final Exam

F- Available university services that support achievement in the course:
N/A

26 References:

A- Required book(s), assigned reading and audio-visuals:
Text book: Physical Chemistry, 4th edition, by Laidler, Meiser and Sanctuary, Houghton Mifflin, Boston (2003)

B- Recommended books, materials and media:

1. "Physical Chemistry," 3rd Edition by R. J. Silby and R. A. Alberty, John Wiley Sons, New York, New York (2000).
2. "Physical Chemistry: a modern introduction," by C. E. Dykstra, Prentice-Hall Publishers, Upper Saddle River (1997).
3. "Physical Chemistry," 6th Edition by G. M. Barrow, Mcgraw-Hill, Boston, Massachusetts (1996).
4. "The Elements of Physical Chemistry," 2nd Edition by P. W. Atkins, Oxford University Press, London, United Kingdom (1996).
5. "Physical Chemistry," 4th Edition by I. N. Levine, McGraw-Hill, New York, New York (1995).
6. "Physical Chemistry," 5th Edition by P. W. Atkins, Oxford University Press, London, United Kingdom (1994).
7. "Physical Chemistry," by G. K. Vemulapalli, Prentice-Hall Publishers, Englewood Cliffs, New Jersey (1993).
8. "A Textbook of Physical Chemistry," by K. K. Sharma and L. K. Sharma, Vani Educational Books, New Delhi, India (1986).
9. "Principles of Physical Chemistry with Applications to the Biological Sciences," by D. Freifelder, Jones and Bartlett Publishers, Boston, Massachusetts (1985).
10. "Physical Chemistry," 2nd Edition by J. P. Bromberg, Allyn and Bacon, Boston, Massachusetts (1984).
11. "Physical Chemistry," by B. D. Khosla, R. Chard, New Delhi, India (1983).
12. "Physical Chemistry," by W. J. Moore, Prentice-Hall Publishers, Englewood Cliffs, New Jersey (1972).

27 Additional information:

N/A

Name of Course Coordinator: Prof. Ehab AlShamaileh

Signature: *Ehab AlShamaileh*

Date: 13/7/2020

Head of Curriculum Committee/Department: -----

Signature: -----

Head of Department: -----

Signature: -----

Head of Curriculum Committee/Faculty: -----

Signature: -----

Dean: -----

Signature: -----