



ASU
جامعة العلوم التطبيقية الخاصة
APPLIED SCIENCE PRIVATE UNIVERSITY

AMMAN - JORDAN



المستوى الذهبي

جامعة كل العرب

Course Syllabus
Faculty of Arts and Science

Academic Department Chemistry

Academic Year 2021/2022 Semester: Second

Course Title :	General Chemistry (2)
Course No. :	1722102
Prerequisite :	1501130
Concurrent :	-
Department :	Chemistry
Coordinator :	Dr. Dima Khater
Mode of Instruction	<u>On-Campus Learning</u> - 3 hours in-class (Synonym) learning

*** Instructor:**

Lecturer	Office Phone	Room No.	Office Hours	E-mail
Dr. Dima Khater	1283	224	11.00-12.00 S, M, T, W, Th	d_khater@asu.edu.jo

Course Description

General Chemistry (II) covers fundamentals of chemistry including thermochemistry, reactions in aqueous solutions, redox reactions, stoichiometry, chemical equations and metathesis reactions, atomic structure, chemical bonding, molecular structure, properties of liquids, solids & solutions. acids & bases properties. Lecture sessions are designed to clarify the concepts covered in this course and study example problems that must be learned to solve. Attendance is expected and students are responsible for being denied from the final exam if the absence exceeds 15% of the lecture sessions.

Amman – Jordan – عمان – الأردن: _ Tel: 5609999 _ فاكس: 5232899 _

رمز النموذج: UF 28 / 2

رقم القرار 24 / 233

تاريخ الاعتماد 2019/10/13



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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 fundamental principles of general chemistry including reactions in aqueous solution, redox reactions, intramolecular and intermolecular bonding, the geometry of compounds, thermochemistry, thermodynamics, and chemical equilibrium.
- A2 solve numerical problems pertaining to colligative properties, thermochemistry, acids, and bases the solubility of ionic salts in water.

B. Cognitive and Intellectual Skills (Student should):

- B1 be skilled in problem-solving, critical thinking, and analytical reasoning.

C. Subject Specific Skills (Student should):

- C1 collaborate effectively with other people in a team
- C2 communicate the results of scientific work

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 four principal areas of chemistry, i.e. analytical, organic, inorganic, and physical.
1.3	Align major issues currently at the frontiers of chemical research and development.
1.7	State certain subjects that are academically and/or professionally related to chemistry (for those completing the BS.C. Chemistry degree that includes elective courses).
2.1	Differentiate between the different states of the matter, elements, and compounds based on the recognition and quantification of the properties.
2.2	Explain concepts, principles and determine the efficiency of chemical systems by applying mathematical expressions.
2.7	Calculate mathematically the output of different chemical reactions.
3.1	Demonstrate adequate life-long learning skills.
4.3	Interpret data derived from laboratory observations and measurements in terms of their significance and the theory underlying them.

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PLO	A1	A2	B1	C1	C2
1.1	√				
1.2	√				
1.3			√		
1.7	√	√			
2.1	√				
2.2		√			
2.7			√		
3.1				√	√
4.3					√

Course Contents and Schedule

Week	Day and Date	Topics to be covered	Method of instruction	CLOs	PLOs
1	Sun. 6 th Mar.	6.2 Nature of energy	In-class lecture	A1 A2 B1	1.1
	Tue. 8 th Mar.	6.3 The first law of thermodynamics	In-class lecture		1.2
	Thur. 10 th Mar	6.4 Heat and work	In-class lecture		1.3 1.7
2	Sun. 13 th Mar.	6.5 Constant volume calorimetry	In-class lecture	A1 A2 B1	1.1
	Tue. 15 th Mar.	6.6 Enthalpy	In-class lecture		1.2
	Thur. 17 th Mar	6.7 Constant pressure calorimetry 6.8 Hess's law	In-class lecture		1.3 1.7
3	Sun. 20 th Mar.	6.9 Standard heat of formation	In-class lecture	A1 A2 B1	1.1 1.2 1.7 1.3
	Tue. 22 th Mar.	4.4 Types of aqueous solutions	In-class lecture		
	Thur. 24 th Mar.	4.5 Precipitation reactions 4.6. Representing aqueous reactions 4.7. Acid-Base reaction	In-class lecture		
4	Sun. 27 th Mar.	7.1. The Nature of light	In-class lecture	A1	1.1



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	Tue. 29 th Mar.	7.2. Atomic spectroscopy and the Bohr Model.	In-class lecture	A2	1.2
	Thur. 31 th Mar	7.3. The wave nature of matter. 7.4. Quantum mechanics and the atom. 7.5. The shapes of atomic orbitals.	In-class lecture	B1	1.7 1.3
5	Sun. 3 rd April	8.5. Quantum numbers	In-class lecture	B1 A1 A2	1.1 1.2 1.7 1.3
	Tue. 5 th April	8.6 Electron Spin	In-class lecture		
	Thur. 7 th April	8.7. Energy levels and Ground State Electron Configuration	In-class lecture		
6	Sun. 10 th April	8.8. Periodic Table and Electron Configuration	In-class lecture	B1 A1 A2	1.1 1.2 1.7 1.3
	Tue. 12 th April	8.9. Atomic Orbitals; Shape and Orientation	In-class lecture		
	Thur. 14 th April	8.10. Periodic Table and properties of the elements	In-class lecture		
7	Sun. 17 th April	9.1. Types of chemical bonds	In-class lecture	A1	1.1 1.2
	Tue. 19 th April	9. 2 Representing valence electrons with dots	In-class lecture		
	Thur. 21 st April	9.3. Ionic bonding: Lewis structure 9.4. Covalent bonding: Lewis structures	In-class lecture		
8.	Sun. 24 th April	9.5. Electronegativity and bond polarity	In-class lecture	A1	1.1 1.2
	Tue. 26 th April	9.6. Lewis structure of molecular Compounds and polyatomic ions	In-class lecture		
	Thur. 28 th April	9.7. Exceptions to the octet rule	In-class lecture		
9	Sun 1 st May	Official holiday			
	Tue. 3 th May				
	Thur. 5 th May				
10	Sun 8 th May	10.2 VSEPR theory: The five basic shapes	In-class lecture	B1 A1 A2	1.1 1.2 1.7 1.3
	Tue. 10 th May	10.3 VSEPR theory: the effect of lone pairs	In-class lecture		
	Thur. 12 th May	10.4 VSEPR Theory: predicting molecular geometries 10.5 Molecular shape & polarity	In-class lecture		
11	Sun 15 th	10.7 Valence bond theory:	In-class lecture	B1	1.1



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	May	hybridization of atomic orbitals	In-class lecture	A1	1.2
	Tue. 17 th			A2	1.7
	May	11.2 Solids, Liquids, and Gases: A molecular comparison	In-class lecture	C2	1.3
	Thur. 19 th	11.3 Intermolecular forces: The forces that hold condensed states together		3.1	4.3
12	Sun. 22 nd	11.4 Intermolecular forces in action: Surface tension, viscosity, and capillary Action	In-class lecture	A1 B1 C2 C1	4.3
	May				1.1
	Tue. 24 th May	11.5 Vaporization and Vapor Pressure	In-class lecture		1.2
	Thur. 26 th May	11.6 Heating Curve for Water 11.7 Phase Diagrams	In-class lecture		1.7 1.3 3.1
13	Sun. 29 th	11.8 Water: An Extraordinary Substance	In-class lecture	A1 B1 C2 C1	4.3
	May				3.1
	Tue. 31 th	12.2 Types of solutions and solubility	In-class lecture		1.1
14	Thur. 2 nd	12.5 Expressing solution concentration	In-class lecture	C2 C1	1.2
	Jun	12.6 Colligative properties			1.7
		12.7 Colligative properties of strong electrolyte solutions			1.3
15	Sun. 5 th Jun	15.2 The Nature of Acids and Bases	In-class lecture	C2 C1	4.3
	Tue. 7 th Jun	15.3 Definitions of Acids and Bases	In-class lecture		3.1
	Thur. 9 th Jun	15.4 Acid Strength and the Acid Ionization Constant 15.5 Autoionization of Water and pH	In-class lecture		
16	Sun. 12 th	15.6 Finding the pH of Strong and Weak Acid Solutions	In-class lecture	C2 C1	4.3
	Jun				3.1
	Tue. 14 th	15.7 Base Solutions	In-class lecture		
17	Thur. 16 th	The Acid-Base Properties of Ions and Salts	In-class lecture		
	Jun	15.8 Acid Strength and Molecular Structure 15.10 Lewis Acids and Bases			
16.	Final Exam				



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Grading Plan and Assessment Tools

Assessment Tools	Weights	Due date
Mid-term	30	TBA
Assignments	10	TBA
Quizzes	10	TBA
Interactive lectures	
Group Work	
Presentation	
Reports	
Project	
Case-Study	
Final Exam	50	TBA

Supplementary Reading

Textbook:

- Principle of Chemistry, A molecular approach, by Nivaldo J. Tro, 3rd Edition, Pearson (2016).

References:

- Chemistry, Matter and Its Changes; By: Brady, Russell & Holum, 3E, J.W., 2000.
- Chemistry, The Study of Matter and Its Changes by: Brady & Holum 2nd. E. 1996.
- General Chemistry by Zumdahl 5th E. McGraw Hill. 2000.



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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: -----

Copy to:

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

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