



University of Petra		 جامعة البتراء - خمسة وعشرون عاما University of Petra Anniversary
Faculty of Arts and Sciences		كلية الآداب والعلوم
Department of Chemistry		قسم الكيمياء

Course Syllabus

Year: 2019/2020

Semester: First

Course No.	Course Title	Prerequisite	Co-requisite	Credit Hours Lectures / European Credit Transfer System (ECTS)
101103	General Chemistry	None	None	3/5

Instructor Name	E-mail	Office No.	Office ext.	Office Hours
Amal Al ma'areef	aalmaareef@uop.edu.jo	7214	7214	9:00 – 10:00 Sun. Tue . Thu 11:00 – 12:00 Sun. Tue.

Short Course Description	<p>This course covers the following topics:</p> <ul style="list-style-type: none"> - A Very Brief History of Chemistry (Chapter 0). - Scientific Measurements (Chapter 1). - Elements, Compounds and the Periodic Table (Chapter 2). - The Mole and Stoichiometry (Chapter 3). - Molecular View of Reactions in Aqueous Solutions(Chapter 4). - Oxidation-Reduction Reactions (Chapter 5). - The Quantum Mechanical Atom (Chapter 7). - The Basics of Chemical Bonding (Chapter 8). - Theories of Bonding and Structure (Chapter 9).
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Course Objectives

- To introduce students to the basic concepts of general chemistry.
- To instill in students a sense of enthusiasm for chemistry, an appreciation of its application in different contexts and to involve them in an intellectually stimulating experience of learning and studying.
- To develop in students, the ability to apply their chemical knowledge and skills to the solution of theoretical and practical problems in chemistry.
- To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of chemistry or multi-disciplinary areas involving chemistry.
- To generate in students an appreciation of the importance of chemistry in an industrial, economic, environmental and social context.

Course Intended Learning Outcomes (ILOs) and their Alignment with Program ILOs, Teaching and Learning Methods, and Assessment Methods:

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
Knowledge (K)			
Define all topics mentioned in the course contents.	K1	Lectures and	Exams
Explain the essential facts related to course contents.	K2	Discussions	
Intellectual Skills (I)			
Perform calculations related to: Scientific Measurements, the Mole and Stoichiometry, Reactions in Aqueous Solutions, Oxidation-Reduction Reactions, and the Quantum Mechanical Atom.	I1	Lectures and Discussions	Exams
Transferable Skills (T)			
Achieved through goals mentioned in ILOs (K,I).			

Course Schedule:

Week	Topic Details	Course ILO number	Section No.	Section Title	Pages Required	Practice Exercises	Review Problems	Reference
1	A Very Brief History of Chemistry. (Chapter 0)	K1, K2	0.5	Internal Structure of the Atom	13 till 16	0.8, 0.9	0.31, 0.33.	Text Book
2-3	Scientific Measurements. (Chapter 1)	K1, K2, I1	1.2	Matter and Its Classification	All	1.2, 1.3, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.12(b).	1.27, 1.29, 1.31, 1.37, 1.39, 1.41 (except c), 1.43, 1.47.	
			1.3	Physical and Chemical Properties	All			
			1.4	Measurement of Physical and Chemical Properties	All (except Table 1.4)			
			1.5	The Uncertainty of Measurements	All			
			1.6	Dimensional Analysis	All			

4	Elements, Compounds and the Periodic Table. (Chapter 2)	K1, K2	2.1	The Periodic Table	All (except page 64)	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.12 (except d), 2.22 (except d), 2.23, 2.24.	2.37, 2.43, 2.49, 2.51, 2.55, 2.57, 2.61, 2.63, 2.67 (except h), 2.69.
			2.2	Metals, Nonmetals and Metalloids	All		
			2.3	Molecules and Chemical Formulas	All (except pages 73, 75, 76)		
			2.4	Chemical Reactions and Chemical Equations	All		
			2.5	Ionic Compounds	All		
			2.6	Nomenclature of Ionic Compounds	All		
			2.7	Molecular Compounds	All (except pages 92 till 94)		
			2.8	Nomenclature of Molecular Compounds	All		
5-6	The Mole and Stoichiometry. (Chapter 3)	K1, K2,I1	3.1	The Mole and Avogadro's number	All	3.1, 3.2, 3.5,3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.20, 3.21, 3.22, 3.23, 3.24, 3.26,3.27, 3.28, 3.29, 3.32, 3.33, 3.34, 3.35.	3.37,3.39,3.41, 3.43,3.45,3.49, 3.51,3.53,3.55, 3.59,3.63,3.65, 3.69,3.73,3.75, 3.77,3.79,3.75, 3.77,3.79,3.81, 3.85,3.87,3.93, 3.95,3.97, 3.103, 3.105, 3.109, 3.111.
			3.2	The Mole, Formula Mass, and Stoichiometry	All		
			3.3	Chemical Formula and Percentage Composition	All		
			3.4	Determining Empirical and Molecular Formulas	All		
			3.5	Stoichiometry and Chemical Equations	All		
			3.6	Limiting Reactants	All		
			3.7	Theoretical Yield and Percentage Yield	All		
7	Molecular View of Reactions in Aqueous Solutions. (Chapter 4)	K1, K2,I1	4.1	Describing Solutions	All	4.24, 4.25, 4.26, 4.27, 4.29, 4.30, 4.31.	4.71, 4.73, 4.75, 4.77, 4.79.
			4.7	Molarity	All		
8	Oxidation-Reduction Reactions. (Chapter 5)	K1, K2	5.1	Oxidation -Reduction Reactions	All	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10.	5.23, 5.25, 5.27, 5.29, 5.31, 5.33, 5.35, 5.37.
			5.2	Balancing Redox Equations	All		
9-11	The Quantum Mechanical Atom. (Chapter 7)	K1, K2,I1	7.5	Quantum Numbers of Electrons in Atoms	All	7.9, 7.10, 7.11, 7.12, 7.13, 7.14, 7.16, 7.17, 7.18, 7.19, 7.20, 7.22, 7.23, 7.24, 7.25, 7.26,	7.43, 7.45, 7.47, 7.49, 7.51, 7.53, 7.55, 7.57, 7.59, 7.61, 7.63, 7.65, 7.67, 7.69, 7.71, 7.73, 7.75, 7.77, 7.79, 7.81.
			7.6	Electron Spin	All		
			7.7	Energy Levels and Ground State Electron Configurations	All		
			7.8	Periodic Table and Ground State Electron Configurations	All		

			7.9	Atomic Orbitals: Shapes and Orientations	All		
			7.10	Periodic Table and Properties of the Elements	All (except page 344)		
12-13	The Basics of Chemical Bonding. (Chapter 8)	K1, K2	8.1	Energy Requirements for Bond Formation	All	8.1, 8.4, 8.5, 8.6, 8.7, 8.8, 8.13, 8.14, 8.16 (exclude HClO_4)	8.33, 8.35, 8.37, 8.39, 8.41, 8.43, 8.47, 8.49, 8.57, 8.59, 8.61, 8.63.
			8.2	Ionic Bonding	All (except figure 8.4)		
			8.3	Octet Rule and Electron Configurations of Ions	All		
			8.4	Lewis Symbols: Keeping Track of Valence Electrons	All		
			8.5	Covalent Bonds	All		
			8.6	Bond Polarity and Electronegativity	All (except pages: 369, 370 (upper half), 372, 373)		
			8.7	Lewis Structures	373 till 377 (exclude oxoacids), 383		
			8.8	Resonance Structures	All		
14-15	Theories of Bonding and Structure. (Chapter 9)	K1, K2	9.1	Five Basic Molecular Geometries	All	9.1, 9.2, 9.3, 9.5, 9.6, 9.7, 9.8, 9.11, 9.12, 9.13, 9.14, 9.15, 9.16, 9.17, 9.18, 9.19, 9.20, 9.21	9.25, 9.27, 9.29, 9.31, 9.33, 9.35, 9.37, 9.43, 9.45, 9.47, 9.49, 9.53.
			9.2	Molecular Shapes and VSEPR Model	All		
			9.3	Molecular Structure and Dipole Moments	All		
			9.4	Valence Bond Theory	All		
			9.5	Hybrid Orbitals and Molecular Geometry	All		
			9.6	Hybrid Orbitals and Multiple Bonds	All		

Assessment Methods and Grading System:

Assessment method	Grade	Date & Time	Comments
First Exam	30		- All Exams are done on - line (electronic). - Every student should bring his own scientific calculator when entering the exam lab. Calculators are not allowed to be exchanged between students during exam.
Second Exam	30		
Final Exam	40	<i>Set by Registrar later</i>	
Total	100	-----	

			- Students are not allowed to carry their mobiles inside exam lab.
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Learning References:

1- Textbook (s):	Chemistry, James E. Brady, Neil D. Jespersen, Alison Hyslop, 7 th edition, 2015.
2- References:	1. General Chemistry, Chang, 2. General Chemistry, Petrucci.
3- Other Resources: <<Labs, computer resources, lecture rooms needed for the course>>	A lecture room with data show facility.

Course Policies¹

- 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	Date	Signature
Head of Department	Dr. Abdel Mnim Altwaiq	19/10/2019	
Faculty Dean/	Prof. Rami Abdel Raheem	24/10/2019	

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

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