

University of Petra		
Faculty of Art & Sciences		كلية الآداب والعلوم
Department of Chemistry		قسم الكيمياء

### Course Syllabus

Year: 2019/2020

Semester: Second

Course No.	Course Title	Pre-requisite	Co-requisite	Credit Hours	ECTS*
101231	Inorganic Chemistry (1)	101102	None	3	5

\* European credit point transfer system

Instructor's Name	Instructor's email	Office No.	Office Ext.	Office Hours
Dr. Muayad Esaifan	muayad.esaifan@uop.edu.jo	7117	7117	Sun., Tue. 8-9, 10-11 Wed. 11-13, Thur. 8-9 & 11-13

Course Description	<p>This course covers the following topics:</p> <ul style="list-style-type: none"> <li>- Atomic structure (Chapter 1).</li> <li>- Bonding Theories (Chapter 2).</li> <li>- Structure of solids (Chapter 3).</li> <li>- Molecular symmetry (Chapter 4).</li> </ul>
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#### Course Objectives:

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

#### **Course Intended Learning Outcomes (ILOs) and their Alignment with Program ILOs:**

**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
<b>Knowledge (K)</b>			
1-Demonstrate knowledge and understanding of all subject areas mentioned in the syllabus. 2- Draw inorganic compound structures that will lead to inspection of their physical properties.	K1  K2	Lectures, Discussions, & H.W	Exams, Quizzes
<b>Intellectual Skills (I)</b>			
2- Perform calculations related to Atomic structure, B.E, Lattice enthalpy and unit cells parameters.	I2	Lectures, Discussions, & H.W	Exams, Quizzes
<b>Transferable Skills (T)</b>			
Not applicable			

<b>Course Schedule:</b>				
Week	Topic	Topic details	Course ILOs #	Ref.
1	Introduction: Atomic Structure:	General 7.1-Electromagnetic radiation	K1,I2.	Brady
2	Atomic Structure:	7.2- Atomic spectra & the bohr model of the hydrogen atom. 7.3- Wave properties of matter.		
3	Atomic Structure:	chap.1 shriver: 1.3 The classification of elements. 1.4- Some principles of Quantum mechanics. 1.5- Atomic orbitals.	K1,I2,	shriver:
4	Atomic Structure:	1.6-penetration & shielding. 1.7-The building-up principle. 1.8- Atomic parameters. Exercises :1.3;1.5-1.7;1.9-1.10;1.12; 1.15;1.17; 1.18; 1.19		shriver:
5	Molecular Structure & bonding.	chap.2 : 2.1 The octet rule. 2.2 Structure & bond properties. 2.3- The VSEPR theory.	K1,K2,	shriver:
6	Molecular Structure & bonding.	3.4- The hydrogen molecule 3.5- Homonuclear diatomic molecules. 3.6- Polyatomic molecules.		shriver:
7	Molecular Structure & bonding.	MOT 3.7- Introduction to MOT. 3.8- Homonuclear diatomic molecules.		shriver:
8	Molecular Structure & bonding.	3.9 Heteronuclear diatomic molecules. 3.10 bond properties in the MO formalism. Exercises 3.1-3.15		shriver:

9	The Structures of Simple Solids	chap.2 2.1 Unit cells and the description of crystal structure. 2.2 The close packing of spheres. 2.3 Holes in close-packed structures.	K1, k2,I2,	shriver:
10	The Structures of Simple Solids	2.4- polymorphism. 2.5 Structures that are not close –packed. 2.6 polymorphism of metals.		shriver:
11	The Structures of Simple Solids	2.7 Atomic radii of metals. 2.8- Alloys 2.9 Characteristic structures of ionic solids. 2.10 The rationalization of structures		shriver:
12	The Structures of Simple Solids	2.11 The energies of ionic bonding. 2.12 Consequences of lattice enthalpies. Exercises 2.1,2.3-2.7-2.19		shriver:
13	Molecular Symmetry:	chap.4: 4.1-4.10 4.1- Symmetry elements & symm.operations.	K1,k2	shriver:
14	Molecular Symmetry:	4.2-The point groups of molecules		shriver:
15	Molecular Symmetry:	4.3-polar molecules		shriver:
16	Molecular Symmetry:	4.4-chiral molecules. ; Exercises 4.1- 4.6		shriver:

### **Learning References:**

**Textbook:** : “Inorganic Chemistry “ by Duward shriver & Peter Atkins, 3<sup>rd</sup> edition, Oxford, 2003.

### **Other References:**

- 1- Inorganic Chemistry, 2<sup>rd</sup> Edition, by GARY L. MIESSLER , DONALD A. TARR.
- 2- Chemistry, Matter & its changes, Brady, Russel, & Holum., 3<sup>rd</sup> ed.
- 3- Chemistry; By Zumdahl, 5<sup>th</sup>. Ed.
- 4- Internet notes.

### **Tests & Evaluation:**

Assessment method	% Grade	Date
1 <sup>st</sup> Exam	30	-2019
2 <sup>nd</sup> Exam	30	-2019
Activity, Quizez & Attendance	-	-
Final Exam	40	Set by Registrar

## **Course Policies**

- 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.

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<b>Approved by</b>	<b>Name</b>	<b>Date</b>	<b>Signature</b>
Head of Department	Dr. Abdelmnim Al Tweiq	23.2.2020	
Faculty Dean	Prof. Dr. Rami Abd elrahem	23.2.2020	

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