بسم الله الرحمن الرحيم

جامعة آل البيت

جامعة آل البيت
دائرة ضمان الجودة والتخطيط

كلية .....العلوم.....

قسم .....الكيمياء.....

توصيف مساق....Chem 403324.....

1. معلومات مدرس المساق (Instructor)

اســـم (مدرس / منسق) المساق :	Basem Fares Ali
الساعـــــات المكتبيـــــــــــة :	12−1(Sun); 9.30−10.30 (Mon);11−12 (Tue)
رقم المكتب والرقـــم الفرعـــــي :	2142
البريـــــــــد الالكترونـــــــــي :	bfali@aabu.edu.joi
مساعد البحث والتدريس/المشرف/الفني (إن وجد):	NA

2. وصف المساق (Course Description)

The course devoted to the systematic study of the varying chemistries of main group elements (only groups 13-18). The course provides the descriptive chemistry of these groups and particularly the most common elements their compounds, reactions and the synthesis. The course spans also symmetry, structure and bonding models for elements and compounds and the important applications.

3. بيانات المساق (Course Title)

رقم المساق: 403324	**اسم المساق: Main Group Chemistry**	**المستوى: Year 4/ Level 1**
طبيعة المساق: نظري	**المتطلب السابق / المتزامن: 403101**	**وقت المحاضرة : 11-12.30**
العام الجامعي: 2019 / 2020	**الفصل الدراسي: Session 1- 2019/2020**	**عدد الساعات الدراسية: 3**

4. أهداف المساق (Course Objectives)

أ-	Discuss the classification of the elements of the periodic table in terms of the major categories and electronic configurations.
ب-	State and make predictions about the group or period in which elements are likely to be found based on their electronic configuration and/or periodic trends.
ج-	Discuss terms such as catenation and allotropy in relation to nonmetallic elements.
د-	Discuss the synthesis, structure, properties and allotropes of the elements and comparisons.
هـ-	Describe the structures and bonding of certain main group nonmetallic elements and their allotropes: boron, carbon, nitrogen and phosphorous, sulfur and oxygen.

5. مخرجات التعلم (Intended Student Learning Outcomes)
(المعرفة والمهارات والكفايات)

يفترض بالطالب بعد دراسته لهذا المساق أن يكون قادرا على:

After completing the course, the student will be able to:

1. Identify the position of the transition metals in the periodic table and describe the electronic configuration of elements.
2. Recognize the chemical methods of extracting pure metals from their ores.
3. Describe the general properties of the main group elements.
4. Predict the general properties of the transition metals
5. Establish a solid understanding on the principles of main-group (p block) element chemistry.
6. Recognize the use of main group elements in applications in daily life.

7. محتوى المساق (Course Content)

الموضــوع	الأسبوع
Introduction to main group chemistry: The classification of the elements of the periodic table in terms of the major categories and electronic configurations.	1
Group 13 Elements: Occurrence, extraction, uses, and properties of the Group 13 elements, Simple hydrides and polyhydrides, Halides and complex halides, borane clusters, Oxides, oxoanions and hydroxides, Compounds containing nitrogen, borazine and Borazine analogues, Aluminium to thallium: salts of oxoacids, aqueous solution chemistry and complexes, Metal borides, Electron-deficient borane and carbaborane cluster. Reactions of group 13.	2 - 4
Group 14 Elements: Occurrence, extraction, uses, and properties of the Group 14 elements, Simple hydrides, oxides, halides, and reactions of group 14.	5 - 6
First Exam (Groups 13 and 14 elements)	
Group 15 Elements: Occurrence, extraction, uses, and Physical properties. Group trends. Hydrides, Nitrides, phosphides, arsenides, antimonides and bismuthides, Halides, oxohalides and complex halides, Oxides of nitrogen, Oxoacids of nitrogen, Oxides of phosphorus, arsenic, antimony and bismuth, Oxoacids of phosphorus, Oxoacids of arsenic, antimony and bismuth, Phosphazenes, Sulfides and selenides.	7 - 9
Group 16 Elements: Occurrence, extraction and uses, Physical properties and bonding considerations, The elements, Hydrides, Metal sulfides, polysulfides, polyselenides and polytellurides, Halides, oxohalides and complex halides, Oxides, Oxoacids and their salts, Compounds of sulfur and selenium with nitrogen.	10 + 12
Second Exam (Groups 15 and 16 elements)	
Group 17 Elements: Occurrence, extraction and uses, Physical properties and bonding considerations, The elements, Hydrogen halides, Metal halides: structures and energetic, Interhalogen (hypervalent) compounds and polyhalogen ions, Oxides and oxohalides, Oxoacids and their salts.	13 + 14
Group 18 Elements: Occurrence, extraction, uses, and physical properties. Xenon, and krypton compounds: halides, oxides, organo-compounds.	15
Final Exam (week 16; All material covered)	16

9. استراتيجيات التعليم والتعلم وطرق التقويم

(Teaching and learning Strategies and Evaluation Methods)

نوع التقويم/القياس (امتحان/عروض صفية/مناقشة/واجبات)	أنشطة التعلم	استراتيجيات التدريس	مخرجات التعلم	ت
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions - Class room participation and assignments	Express the basic chemical principles of intermolecular forces, solutions, kinetics, equilibria and thermodynamics.	1
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions - Class room participation and assignments	Rationalize the physical properties of solid, liquid, and gas phases of matter based on intermolecular forces.	2
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions - Class room participation and assignments	Apply scientific reasoning and analysis to solve scientific problems.	3
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions - Class room participation and assignments	Recognize and deal with different types stoichiometric principles of different discussed topics	4
- Examination	- Class notes - Continuous discussion of the material	- Power point Lectures - Homeworks - Problem solving	Elucidate the basic concepts of acids and bases and applications	5

	- Problem sets and solutions. - Assignments	- Oral discussions- Class room participation and assignments		
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions- Class room participation and assignments	Utilize the concepts of thermodynamics to explain solubility, kinetics, equilibria and electrochemistry.	6
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Homeworks - Problem solving - Oral discussions - Class room participation and assignments	Relate the daily life applications to the topics covered in general chemistry and other areas.	7

1. تقييم الطلبة (Assessment)

الأساليب المستخدمة	توقيت التقييم	توزيع الدرجات لكل أسلوب
1–أعمال الفصل: (تقرير، وظائف، حضور)	خلال الفصل	0
2–امتحان تحريري أول	الأسبوع الرابع	25%
2–امتحان تحريري ثاني	الأسبوع السابع	25%
3–امتحان تحريري نهائي	أسبوع الامتحانات النهائية	50%

2. الكتاب المقرر (Text Book)

المرجع الرئيس	Descriptive Inorganic Chemistry
المؤلف	Geoff Rayner-Canham
الناشر	W. H. Freeman
السنة	2013
الطبعة	Sixth edition
الموقع الالكتروني للمرجع	**ISBN-10:** 1464125570; **ISBN-13:** 978-1464125577

3. المراجع الإضافية (References) (وتشمل الكتب والبحوث المنشورة في الدوريات او المواقع الالكترونية)

1–	Basic Inorganic Chemistry, by F. A. Cotton, G. Wilkinson and P. L. Gaus 3rd edition, John Wiley, 1995.

Inorganic Chemistry, by J. E. Huheey, E. A. Keiter, and P. L. Keiter, 4th edition, Harper Collins, 1993.	−2
Inorganic Chemistry, by Catherine Housecroft and Alan Sharpe, 3rd edition, Pearson Education, 2005.	−3
Inorganic Chemistry, by D.F. Shriver and P. W. Atkins, 4th edition, Oxford, 2006 or 3rd edition, Oxford, 1999.	−4