

## ٢٢٢ كيم: كيمياء المجموعات الرئيسية

عدد الساعات	الموضوع
2	✓ ملخص النظرية الذرية الحديثة و الجدول الدوري الطويل
1	✓ نتائج الترتيب الدوري للعناصر
1	✓ الهيدروجين
2	✓ عناصر المجموعة الأولى (الليثيوم و السيزيوم)
2	✓ عناصر المجموعة الثانية (البريليوم- الباريوم)
2	✓ عناصر المجموعة الثالثة (الألمونيوم و الثاليوم)
2	✓ عناصر المجموعة الرابعة (الكربون -السيلكون و الرصاص)
3	✓ عناصر المجموعة الخامسة (النيتروجين- الفوسفور و البزموت)
3	✓ عناصر المجموعة السادسة (الأكسجين - الكبريت)
3	✓ عناصر المجموعة السابعة (الفلور و الأستاتين )
3	✓ عناصر المجموعة الثامنة ( الغازات النبيلة)
3	✓ المركبات ذات الرابطة الأيونية
3	✓ المركبات ذات الرابطة التساهمية
6	✓ نظريات الربط الكيميائي 1
6	✓ نظريات الربط الكيميائي 2
3	✓ القوى الكيميائية
45	✓ المجموع

### 222 Chem: Main Group Chemistry

Topic	No. of hour
Summary of the Modern atomic theory & Long Form of Periodic Table	2
The results of the periodic table of the elements	1
Hydrogen	1
Group 1 elements (Li, Cs)	2
Group 2 elements (Be, Ba)	2
Group 3 elements (B, Al, Tl)	2
Group 4 elements (C, Si, Pb)	2
Group 5 elements (N, P, Bi)	3
Group 6 elements (O, S)	3
Group 7 elements (F, At)	3
Group 8 elements (Nobel gases)	3
Bonding in Main-Group Chemistry: Ionic Bonding, Born-Haber cycle, covalency in ionic compounds.	3
Bonding in Main-Group Chemistry: Covalent bonding	3
Shapes of molecules (VSEPR) THEORY, Valence bond Theory (VBT) for Main Groups compounds.	6
Molecular Orbital Theory (MOT) for main group. Diatomic, poly atomic molecules energy level, Chemical Forces.	6
Electronic Deficient Compounds, Boron as an example.	3
Total	45

## **Course Description**

Chemistry 222 Chem will be composed of two main components;

- (1) The Chemistry of selected main group elements, followed by
- (2) Introduction to bonding in polyatomic Molecules.

**Part 1:** Understand the structure bonding and reactivity of selected elements and their simple compounds. This will include a discussion of main group element hydrides, halides and oxides.

### **Part 2:**

Introduction to bonding in polyatomic molecules, this will include a brief review of Lewis, VSEPR and valence bond models followed by a study of molecular shape, symmetry and Molecular orbital theory.

## **Course Objectives**

Students are expected, as a result of tutorial and associated reading, to know the concepts and theories used to describe the chemistry of the main group elements with an understanding of bonding models such as valence bond theory and molecular orbital theory for polyatomic molecules. Selected Examples illustrating the chemistry of the elements in Group 14 to 18 will be discussed.

## **Website**

BLACLBOARD will be used as a main form of communication for course notes, assignments, grades and notifications. The missing of critical information due to your failure to check BLACLBOARD cannot be used as a basis for appeal.

## **Instructor**

Dr. Nouf H. Alotaibi

- Office: 5T242
- Office Hours: Sunday, Tuesday and Thursday 11-12 or by appointment.
- Email: [nhalotaibi@ksu.edu.sa](mailto:nhalotaibi@ksu.edu.sa)
- Email correspondence must be from your @ksu.edu.sa account.

Please include 222 Chem in the subject line

## **Lecture and Tutorial Information**

### ☐ Lectures

- 3 h/week, STTh, 9-10.
- Class room 038- 01-05

### ☐ Tutorial

- 1 h/week, S 12:00- 1:00.
- Class room 038- 01-05

## **Prerequisite Requirements**

- The prerequisite for this class is 107Chem.

## **Evaluation**

- Tests: There will be two exams with 20 marks each and total 40 marks.  
First midterm test on **20/6/1438 corresponding to 19/3/2017.**  
Second midterm test on **19/7/1438 corresponding to 16/4/2017.**
- Tutorial: 20 mark,
- Final Exam: 40 mark.

## **Course Reference**

The list here is merely suggestive and possibly representative. There are many other good books and course materials as well.

1. W. Henders: Main Group Chemistry, RSC Publishin, 2000.
2. J E Huheey, E. A. Keiter, R. L. Keiter and O. K. Medhi; Inorganic Chemistry: Principles of Structure and reactivity, Pearson Education, 2006.
3. P. W. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong; Shriver & Atkins: Inorganic Chemistry, Fourth Edition, Oxford University Press, 2006.
4. F. A. Cotton, G. Wilkinson, C. A. Murillo and M. Bochmann; Advanced Inorganic Chemistry, Sixth Edition, Wiley, 1999.
5. N. N. Greenwood and E. A. Earnshaw, Chemistry of the Elements, Second Edition, Elsevier 1997.
6. 1994, محمود منشي , مكتبة العبيكان, الاسس النظرية لكيمياء المجموعات الرئيسية.