

# National Commission for Academic Accreditation & Assessment

## Course Specification

Institution	Kink Khalid University
College/Department	College of Science –Chemistry Department

### A Course Identification and General Information

1. Course title and code: Chemistry of Main groups elements (Chem 222)
2. Credit hours 2
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) B. Sc.
4. Name of faculty member responsible for the course Dr. Adel El-Zahhar
5. Level/year at which this course is offered 4/2
6. Pre-requisites for this course (if any) Chem -102
7. Co-requisites for this course (if any)
8. Location if not on main campus

## B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The course aims study the chemistry of main group elements. Each group will be maintained individually, with throwing the light on the chemistry of some elements in the group (their compounds, their chemical properties, their reactions and their applications).

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

-Improving the course will include addition of the newest and updating the course content with the newest subjects

-Introducing the newest references that maintain the course subjects

- Introducing the new web pages references

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1 Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Summary on the course contents – Importance of the course – Objective of the course- The arrangement of elements in the periodic table; groups and periods	1	2
The general properties of the elements; periodicity of the general properties – effect of periodicity of general properties on the nature of elements – effect of electronic configuration upon the properties of the elements.	1	2
Chemistry of Hydrogen : general properties – isotopes – chemical properties- reactions – compounds- uses- acids and bases – theories that define acids and bases	1	2
Group IA: Alkali metals: general properties – electronic configuration – compounds – reactions. Sodium: presence in nature – preparation – chemical properties – reactions – uses – some important compounds. Magnesium : its ores –preparation- chemical properties- reactions- compounds	2	4
Group IIA: Alkaline earths : general properties – periodicity of the properties through the group- electronic configuration- compounds – reactions – characteristics of lithium with respect to magnesium – characteristics of beryllium with respect to aluminium	2	4

Group IIIA: general properties – electronic configuration- presence in nature – physical and chemical properties. Boron : Its isotopes with importance – ores and preparation -	2	4
Group IV: electronic configuration –periodicity of properties through the group. Carbon (presence in nature – forms – chemical properties – reactions – compounds. Silicon (presence in nature – physical properties – preparation - chemical properties – reactions – compounds – uses and applications.	2	4
Group V: Presence in nature – general properties – electronic configuration – chemical properties. Nitrogen ( preparation – chemical properties – reactions – compounds – ammonia – nitric acid)	1	2
Group VI: Metallic and nonmetallic properties- electronic configuration – oxidation states – Oxygen (physical properties – preparation and chemical properties – compounds. Ozone (physical and chemical properties) – Sulfur ( presence in nature – preparation and uses - physical and chemical properties – compounds.	1	2
Group VII (Halogens): Electronic configuration – oxidation states – physical properties - presence in nature – preparation – chemical properties – compounds and uses.	1	2
Group VIII (Inert gases) : electronic configuration – physical properties – presence in nature – historical view- chemical properties – applications and uses	1	2

2 Course components (total contact hours per semester):

Lecture: 30	Tutorial:	Laboratory	Practical/Field work/Internship	Other: 4
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3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

- 20 hour on the black board
- 10 hours on the net and the library

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

## **a. Knowledge**

### (i) Description of the knowledge to be acquired

- Knowledge about the periodic table and the importance of elements arrangements
- Arrangement of the elements in groups and periods according to their atomic numbers
- Expecting the physicochemical properties of the element from its arrangement in the periodic table and its electronic configuration
- Arrangement of the elements in principle groups
- Electronic configuration and its effect in the properties of element
- The importance of some elements in group (reactions – compounds – their technological applications and uses)

### (ii) Teaching strategies to be used to develop that knowledge

- Lectures on board with the aid of colour periodic table and data show containing coloured animation explanation
- Let the student connected with knowledge sites on the web through searching in topic in the course with writing reports and discussions

### (iii) Methods of assessment of knowledge acquired

- Monthly quizzes
- Med term exams
- Final exams containing different types of questions like ( writing – true or false – chose one correct answer- explain why – explain with equation – complete equations)
- Short questions in lectures and oral discussions
- Home works on the black board
- search on course topics

## **b. Cognitive Skills**

### (i) Description of cognitive skills to be developed

- Expecting the physical and chemical properties of the elements
- Expecting the products of some reactions based on the element nature and chemical properties
- Ability to distinguish between the elements based on their presence in certain group
- Ability to define the type of reaction that the element could undergo based on the electronic configuration
- Knowing the industrial and technological application of some elements based on their chemical and physical properties and their presence in certain groups

(ii) Teaching strategies to be used to develop these cognitive skills

- Comparing the general properties of the elements with their reactions and compounds
- Explaining different examples on the behaviour of the elements
- Explaining examples on the reactions based on the chemical behaviour of the element
- Explaining the some chemical phenomena for some elements
- Explaining the preparation of some elements and their compounds
- Explaining some applications of some elements
- Discussing the reports presented by students in course topics

(iii) Methods of assessment of students cognitive skills

- Monthly quizzes
- Med term exams
- Final exams containing different types of questions like ( writing – true or false – chose one correct answer- explain why – explain with equation – complete equations)
- Short questions in lectures and oral discussions
- Home works on the black board
- Search on course topics

### **c. Interpersonal Skills and Responsibility**

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Teaching the students how to cooperate and how to deal with each other
- Teaching the students how to committed with laboratory instructions
- Teaching the students the characteristics of chemicals ( toxicity, risk, .....)
- Teaching how use lab. Ware and how to ensure the risk
- Teaching the safety issues in the lab. And how protect themselves from chemicals
- Teaching how to obtain precise results and the meaning of numbers

(ii) Teaching strategies to be used to develop these skills and abilities

- Forming working groups by students and let them chose one of them representative
- Each group perform an activity and chose one of them to represent the report
- The students must perform individual activities
- Discussing a social problem or environmental events with students

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

- Assessment of oral discussion and reports in different subjects
- Assessment of answer for short questions and opinions
- 5% of the total marks on this assessment

### **d. Communication, Information Technology and Numerical Skills**

<p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>- Skills for searching in social and environmental problems</li> <li>- Work arrangement skills</li> <li>- Report setting skills</li> <li>- Oral discussion skills</li> </ul>
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>- Presenting problems and form student groups for searching in this problems</li> <li>- Relating search topics for enhancing cooperation between students</li> <li>- Enhancing the correlation through the black board of the course between students and lecturer</li> <li>- Presenting examples for reports</li> <li>- Presenting model answer for homework</li> <li>- Discussion on the black board</li> </ul>
<p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>- Oral discussion and report assessment</li> <li>- Homework assessment</li> <li>- Activity and contribution assessment</li> <li>- 5% of the sign upon the activity</li> </ul>
<p><b>e. Psychomotor Skills (if applicable)</b></p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p>
<p>(ii) Teaching strategies to be used to develop these skills</p>
<p>(iii) Methods of assessment of students psychomotor skills</p>

<p>5. Schedule of Assessment Tasks for Students During the Semester</p>			
<p>Assessment</p>	<p>Assessment task (eg. essay, test, group project, examination etc.)</p>	<p>Week due</p>	<p>Proportion of Final Assessment</p>

1	Quiz -1	4	2.5
2	First Med Term Exam	7	20
3	Quiz -2	9	2.5
4	Second Med Term Exam	11	20
5	Final Exam	16	50
6	Oral discussion and home work	Continuous	2.5
7	Searching groups and reports	Continuous	2.5

### D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

6 hours official + 3 hours on the black board

### E Learning Resources

1. Required Text(s)

- Main Group Chemistry, A. G. Massy; Wiley, 2<sup>nd</sup> Ed. 1999

2. Essential References

- Chemistry of Main Group Elements, Course by Andrew R. Baarron, CONNEXIONS.

- [http://www.inorganic-chemistry.net/kmpages/chem120/Chapter %208a%20small.pdf](http://www.inorganic-chemistry.net/kmpages/chem120/Chapter%208a%20small.pdf)

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

$\delta$ -Bonding and the Lone Pair Effect in Multiple Bonds between Heavier Main Group Elements , Philip P. Power, Chem. Rev. 99(1999) 3463-3503

4-.Electronic Materials, Web Sites etc

[http://en.wikipedia.org/wiki/Periodic\\_table](http://en.wikipedia.org/wiki/Periodic_table)

- <http://www.ucc.ie/academic/chem/dolchem/html/group.html>

[http://genesission.jpl.nasa.gov/educate/scimodule/cosmic/explore\\_2ST.pdf](http://genesission.jpl.nasa.gov/educate/scimodule/cosmic/explore_2ST.pdf)

5- Other learning material such as computer-based programs/CD, professional standards/regulations

- chem. Web
- Isisdraw ' Chemdraw ' Chemweb
- Webelement periodic table

## **F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

### 1. Accommodation (Lecture rooms, laboratories, etc.)

- Lecture Room ( at least 50 sit wide )

### 2. Computing resources

- Data show facility and sound system
- Computer system

### 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

## **G Course Evaluation and Improvement Processes**

### 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Course questionnaires by students
- Continues contact with students (in Lectures and in office)
- Continues contact with students representative
- Rehearsal of department Head
- Following up the university forum
- Following up the course sit on the black board

### 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Follow up the course file
- Follow up the course report
- Organizing workshops on course report

### 3 Processes for Improvement of Teaching

- Contributing in workshops about teaching



- Following the recommended teaching strategies
- Applying the newest teaching and assessment methods

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Marking a sample of students activities and exams by an independent teaching member in the university

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Continuous contact with student for assessment of course contents
- Continuous contact with students representative