



# Course Specifications

<b>Course Title:</b>	Chemistry of Main Group Elements
<b>Course Code:</b>	222CHEM-2
<b>Program:</b>	Bachelor of Science in chemistry
<b>Department:</b>	Chemistry
<b>College:</b>	Science
<b>Institution:</b>	King Khalid University

## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>4</b>
1. Course Description .....	4
2. Course Main Objective.....	4
3. Course Learning Outcomes .....	5
<b>C. Course Content</b> .....	<b>5</b>
<b>D. Teaching and Assessment</b> .....	<b>6</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods .....	6
2. Assessment Tasks for Students .....	7
<b>E. Student Academic Counseling and Support</b> .....	<b>7</b>
<b>F. Learning Resources and Facilities</b> .....	<b>7</b>
1. Learning Resources .....	7
2. Facilities Required.....	8
<b>G. Course Quality Evaluation</b> .....	<b>8</b>
<b>H. Specification Approval Data</b> .....	<b>9</b>

## A. Course Identification

<b>1. Credit hours:</b>	2
<b>2. Course type</b>	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Level 4 / 2nd Year	
<b>4. Pre-requisites for this course (if any):</b> 102 CHEM-2	
<b>5. Co-requisites for this course (if any):</b> Non	

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	% 100
2	Blended	0	% 0
3	E-learning	0	% 0
4	Correspondence	0	0%
5	Other	0	0%

### 7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
<b>Contact Hours</b>		
1	Lecture	30
2	Laboratory/Studio	0
3	Tutorial	2
4	Others (specify)	0
	<b>Total</b>	30
<b>Other Learning Hours*</b>		
1	Study	20
2	Assignments	5
3	Library	5
4	Projects/Research Essays/Theses	0
5	Others (specify)	0
	<b>Total</b>	30

\* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

## B. Course Objectives and Learning Outcomes

### 1. Course Description

Brief studies about the modern atomic theory, periodic table, elements, groups, and their physical properties will be discussed

- Chemical properties and important chemical reactions for each group at industry and significant effects will be considered
- In addition to the mentioned some applications for interested elements in industry (two elements from each group) will be touched in details.

### 2. Course Main Objective

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

#### 2. What is the main purpose for this course?

Brief studies about the modern atomic theory, long periodic table, elements groups and their physical, chemical properties and important chemicals reaction of for each at industry and significant effect. In addition to the mentioned some application for interested elements in industry (two elements from each group)

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

- E-Learning System is being introduced.
- Students can download course material which can be helpful for the students learning.
- For the research, use internet such as Wikipedia, Google .... etc.
- Interpersonal skills, relating to the ability to interact with other people and to engage in team-working through group discussion.
- Problem solving skills, relating to qualitative and quantitative information

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge:</b>	
1.1	To demonstrate knowledge of the fundamental concepts about the modern atomic theory	K1 K3
1.2	To demonstrate understanding of advanced principles of classification of periodic table and general properties of elements in periods and groups.	K1 K3
1.3	To understand the underlying chemical reaction and methods of preparation of some interested elements in each group and their application in industry	K1 K2
2	<b>Skills:</b>	
2.1	The ability of understanding the basic concepts and principles of elements and the behavior of them in chemical reactions.	S1
2.2	The ability to deduce the physical, chemical and magnetic properties of the elements in each group. And how to predicate the final product according to the concentration of reactants used	S2 S4
3	<b>Competence:</b>	
3.1	To encourage students using the internet to collect statistical data and to present an oral explanation for a subject in the area based on developing critical skills, observation, and feedback.	C2 C3
3.2	To interact positively with colleagues in a group work	C4
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	C1-C2
3.4	To summarize the literature and sources for an area in the course.	C2

### C. Course Content

No	List of Topics	Contact Hours
1	<b>Introduction to the Main Group Chemistry:</b> Atoms and Electronic Configuration, Classifying the elements through the periodic table, families of the periodic table, Metals and Nonmetals, Periodic Trends: Atomic and Ionic Radius, Ionization Energy, Electronegativity, Magnetic Properties.	2
2	<b>Hydrogen:</b> general properties, isotopes, chemical properties, reactions, compounds, uses and applications	4
3	<b>Group 1A (Alkali metals):</b> elements, general properties, electronic configuration, physical and chemical properties, reactions, compounds, uses and applications	4
4	<b>Group 2A (Alkaline earth metals):</b> elements, general properties, electronic configuration, physical and chemical properties, reactions, compounds, uses	4
5	<b>Group 3A:</b> elements, general properties, electronic configuration. Study of the Boron and Aluminum: physical and chemical properties, reactions, compounds, uses and applications	2
6	<b>Group 4A:</b> elements, general properties, electronic configuration. Study of the Carbon and Silicone: presence in nature physical and chemical properties, reactions, compounds,	3

	uses and applications	
7	<b>Group 5A:</b> elements, general properties, electronic configuration. Study of the Nitrogen and Phosphorus: presence in nature, physical and chemical properties, reactions, compounds, uses and applications	3
8	<b>Group 6A: (Chalcogen)</b> elements, general properties, electronic configuration. Study of the Oxygen and Sulfur: presence in nature, physical and chemical properties, reactions, compounds, uses and applications	4
9	<b>Group 7A: (Halogen)</b> elements, general properties, electronic configuration, physical and chemical properties, reactions, compounds, uses and applications	2
10	<b>Group 8A: (Noble or Inert Gas)</b> elements, general properties, electronic configuration, physical and chemical properties, reactions, compounds, uses and applications Xenon-Oxygen Compounds	2
<b>Total</b>		30

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	To demonstrate knowledge of the fundamental concepts about the modern atomic theory	Lectures, Interactive teaching sessions	Lectures, Interactive teaching sessions
1.2	To demonstrate understanding of advanced principles of classification of periodic table and general properties of elements in periods and groups.		
1.3	To understand the underlying chemical reaction and methods of preparation of some interested elements in each group and their application in industry		
<b>2.0</b>	<b>Skills</b>		
2.1	The ability of understanding the basic concepts and principles of elements and the behavior of them in chemical reactions.	Lectures, problem solving sessions	Written exams, oral exams
2.2	The ability to deduce the physical, chemical and magnetic properties of the elements in each group. And how to predicate the final product according to the concentration of reactants used	Tutorials, problem solving sessions	Oral discussion, written examinations
<b>3.0</b>	<b>Competence</b>		
3.1	To encourage students using the internet to collect statistical data and to present an oral explanation for a subject in the area based on developing critical skills, observation, and feedback.	Using available search engines and Information	e-learning.
3.2	To interact positively with colleagues in a group work	Interaction with the students and encourage them to	Oral discussions during lectures

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		discuss during lectures	
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	Interactive teaching sessions	Discussion within a group
3.4	To summarize the literature and sources for an area in the course.	Guided reading of books and articles	Written Reports and summaries

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Electronic homework	5, 9	6%
2	Electronic Quiz	4,8 ,16	6%
3	Midterm exam-1	7	15%
4	Midterm exam-2	12	15%
5	Presentations and reports	4-10	2%
6	Electronic homework	5,9	6%
7	Final written exam	16	50%

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

& separated from theory lecture with independent lecturer

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:**

10 office hours are offered for students for individual consultations. Communications are available on-site, phone conversations, and chatting by social media.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ol style="list-style-type: none"> <li>J. E. Huheey, E. A. Keiter and R. L. Keiter; Inorganic Chemistry: Principles of Structure and Reactivity, Pearson Education, 2006.</li> <li>P.W. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong; Shriver &amp; Atkins: Inorganic Chemistry, 4th ed. Oxford University Press, 2006.</li> <li>Main group chemistry foundations Hussain muhammed Abdulfattah 1<sup>st</sup> edition international publishing 2003. (أسس كيمياء المجموعة الرئيسية د/حسين محمد عبد الفتاح دار النشر الدولي الطبعة الأولى 2003)</li> </ol>
<b>Essential References Materials</b>	<ol style="list-style-type: none"> <li>James E. House, Inorganic Chemistry, Elsevier Inc., 1st edition, 2008, printed in Canada.</li> <li>C. E. Housecroft, A. G. Sharpe, Inorganic Chemistry, 3rd Edition, 2008, Pearson education limited, England.</li> </ol>
<b>Electronic Materials</b>	<a href="http://www.ucc.ie/academic/chem/dolchem/html/group.html">http://www.ucc.ie/academic/chem/dolchem/html/group.html</a> <a href="http://genesission.jpl.nasa.gov/educate/scimodule/cosmic/explore_2ST">http://genesission.jpl.nasa.gov/educate/scimodule/cosmic/explore_2ST</a>

<b>Other Learning Materials</b>	- Isisdraw ·Chemdraw ·Chemweb - Webelement periodic table
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## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Number of seats in each classroom – 45/2 hours (per week) Laboratories - 0 Accessories – Overhead projector
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	MS-Office Software and Internet connection
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Overhead projector Computer for individual students Internet access Isisdraw and Chemdraw and Chemoffice

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course delivery (teaching methods and assessment methods)	Students	Questionnaire
	Departmental Plan and curriculum committee; external reviewers	Report and workshops
	Program Leader	Meetings
Course contents (update)	Departmental Plan and curriculum committee; external reviewers	Report and workshops
Quality of learning resources	External reviewers	Reports

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	Department counsel
<b>Reference No.</b>	1/22/142
<b>Date</b>	15-9-1442