



Course Specifications

Course Title:	Chemistry of the Main Group Elements
Course Code:	4022141-2
Program:	Chemistry and Industrial Chemistry
Department:	Department of chemistry
College:	Faculty of Applied Science
Institution:	Umm Al-qura University




Table of Contents

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

A. Course Identification

1. Credit hours: 2 (theoretical)
2. Course type
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"/>
3. Level/year at which this course is offered: 4 th level/2 nd year
4. Pre-requisites for this course (if any): General Chemistry 2
5. Co-requisites for this course (if any): --

6. Mode of Instruction (mark all that apply)

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

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	--
3	Tutorial	--
4	Others (specify)	--
	Total	30
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	3
4	Projects/Research Essays/Theses	3
5	Others (quizzes and exams preparation)	20
	Total	66

* 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

The current course introduce the construction of the periodic table and the chemistry of main group elements including their structures, general and chemical properties with comparative study of elements in their groups.

2. Course Main Objective

By the end of this course, the student should fully aware of:

- The main group elements in the periodic table.
- The chemical properties of the main group elements through their reactions.
- The existence and most important compounds of the main group elements.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Know the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	K3
1.2	Recognize the horizontal, perpendicular and diagonal relationships in periodic table	K3
1.3	List the chemical properties of hydrogen and its isotopes.	K1
1.4	Define s-block elements and recognize their properties.	K1
1.5	Describe halides and state some chemical properties of lithium and magnesium and definition of the diagonal relationship between lithium and magnesium.	K2
1.6	Recall of the chemical properties of beryllium and recognize the differences between it and second group elements	K3
1.7	Define the p-block elements and recognize their properties.	K3
1.8	Remember the third, fourth, fifth, sixth, seventh and inert gases groups.	K3
2	Skills :	
2.1	Summarize the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	S1
2.2	Compare between the horizontal, perpendicular and diagonal relationships in periodic table	S2
2.3	Interpret the chemical properties of s-block elements.	S2
2.4	Evaluate the diagonal relationship between lithium and magnesium.	S2
2.5	Compare between beryllium and second group elements	S1
2.6	Define the chemical properties of p-block elements.	S1, S4
3	Competence:	
3.1	Use information and communication technology.	C3
3.2	Apply IT and communication technology in gathering and interpreting information and ideas concerning the course topics.	C3
3.3	Develop the student's ability in self-dependence and self-study.	C2
3.4	Encourage students to use on-line libraries for searching and interpreting up to dated aspects relating to the applications and uses of main group elements.	C3

C. Course Content

No	List of Topics	Contact Hours
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1	General and periodic properties of main group (non-transition) elements; electronic structure, size, electron affinity, ionization, electronegativity & electropositivity and oxidation states.	4
2	Horizontal, perpendicular and diagonal relationships in periodic table	2
3	Hydrogen and its position & properties, its isotopes and chemical properties.	2
4	s-block elements; electronic configuration, size, hardness, melting points – chemical properties; chemical reactivity with metals, nitrogen, acids, complexes formation – solubility and hydration – solubility in ammonia	6
5	Halides – some chemical properties of lithium and magnesium – diagonal relationship between lithium and magnesium elements.	2
6	Chemical properties of beryllium and differences between it and second group elements – diagonal relationship between beryllium and aluminum.	2
7	p-block elements; their electronic configuration, properties and their compounds – properties of the first element in each group and compare it with the last element – inert pair effect – metallic and non-metallic properties of groups.	8
8	Independent study of the third, fourth, fifth, sixth, seventh and inert gas groups.	4
Total		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
1.0	Knowledge		
1.1	Know the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties	lecture	quiz
1.2	Recognize the horizontal, perpendicular and diagonal relationships in periodic table	discussion	quiz
1.3	List the chemical properties of hydrogen and its isotopes.	lecture	quiz
1.4	Define s-block elements and recognize their properties.	Lecture and discussion	exam
1.5	Describe halides and state some chemical properties of lithium and magnesium and definition of the diagonal relationship between lithium and magnesium.	Lecture and web based study	exam and report
1.6	Recall of the chemical properties of beryllium and recognize the differences between it and second group elements	Lecture and web based study	exam and report
1.7	Define the p-block elements and recognize their properties.	Lecture and discussion	exam
1.8	Remember the third, fourth, fifth, sixth, seventh and inert gases groups.	Lecture	exam
2.0	Skills		
2.1	Summarize the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	lecture	quiz

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Compare between the horizontal, perpendicular and diagonal relationships in periodic table	lecture and discussion	quiz
2.3	Interpret the chemical properties of s-block elements.	lecture	quiz
2.4	Evaluate the diagonal relationship between lithium and magnesium.	Lecture and web based study	exam and report
2.5	Compare between beryllium and second group elements	lecture and discussion	exam
2.6	Define the chemical properties of p-block elements.	Lecture	exam
3.0	Competence		
3.1	Use information and communication technology.	Scientific discussion and web-based study	web-based student performance systems.
3.2	Apply IT and communication technology in gathering and interpreting information and ideas concerning the course topics.	web-based study	web-based student performance systems
3.3	Develop the student's ability in self-dependence and self-study.	Scientific discussion	individual and group presentations
3.4	Encourage students to use on-line libraries for searching and interpreting up to dated aspects relating to the applications and uses of main group elements.	Library visits and web-based study	web-based student performance systems

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
4	Final Exam.(2 hours exam)	16	50 %

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

E. Student Academic Counseling and Support

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

- Office hours: During the working hours weekly,
- Academic advising for students.
- Availability of Staff members to provide counseling and advice.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- A. G. Massey, Main Group Chemistry, 2nd Edition, Wiley, 2000. - F. A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry, A comprehensive text, 1988, John Wiley & Sons.
Essential References Materials	Das, Kumar V.G, Main Group Elements and their Compounds, Springer, 1996.
Electronic Materials	- http://www.chemweb.com - http://www.sciencedirect.com - http://www.rsc.org
Other Learning Materials	- None.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Well provided Classrooms with capacity of (30) students
Technology Resources (AV, data show, Smart Board, software, etc.)	Rooms equipped with computers and data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	students	Questionnaire evaluation of the course.
Evaluation of the extent of achievement of course learning outcome	Program/Department Instructor	Annual course report
Verification of Standards of Student Achievement	Peer review	- Check marking of a sample of exam papers, or student work. -Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

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

Council / Committee	
Reference No.	
Date	

Received by: **Dr. Ismail Althagafi**

Department Head

Signature:



Date: 20/12/2019

