



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

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A. Course Identification

1. Credit hours:
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): nothing

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	75 %
2	Blended	--	--
3	E-learning	√	25%
4	Distance learning	--	--
5	Other	--	--

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	--
3	Tutorial	--
4	Others (E-learning + Exams + office hours)	10
	Total	32

B. Course Objectives and Learning Outcomes

1. Course Description The current course introduces 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: a. The main group elements in the periodic table. b. 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 and Understanding	
1.1	Recognize 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 in addition to the horizontal, perpendicular and diagonal relationships in periodic table	K1
1.2	List the chemical properties of hydrogen and its isotopes.	K2
1.3	Describe halides and state some chemical properties of lithium and magnesium and definition of the diagonal relationship between lithium and magnesium.	K2
1.4	Recall of the chemical properties of beryllium and recognize the differences between it and second group elements	K2
1.5	Define the p-block elements in their groups and recognize their properties.	K2
2	Skills :	
2.1	Apply the definition of atomic and ionic size, ionization potential, electron affinity and electro-negativity to understand the periodic properties of main group (non-transition) elements.	S1
2.2	Compare between the horizontal, perpendicular and diagonal relationships in periodic table	S2
2.3	Evaluate the diagonal relationship between lithium and magnesium.	S2
2.4	Compare between beryllium and second group elements.	S2
2.5	Use computers and internet to find all information related to main group elements and their compounds.	S5
3	Values:	
3.1	Work individually to use the on-line libraries for searching and interpreting the course topics.	V2
3.2	Work collaboratively and constructively for searching and interpreting up to dated aspects relating to the properties and importance of main group elements and their compounds.	V3

C. Course Content

No	List of Topics	Contact Hours
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	4
5	Halides – some chemical properties of lithium and magnesium – diagonal relationship between lithium and magnesium elements.	2
6	Midterm exam	1
7	Chemical properties of beryllium and differences between it and second group elements – diagonal relationship between beryllium and aluminum.	2
8	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.	4
9	Independent study of the third and fourth,	2

10	Properties of fifth and sixth groups	3E
11	Properties of seventh and eight groups	3E
	Final exam	2
Total		31

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 and Understanding		
1.1	Recognize 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 in addition to the horizontal, perpendicular and diagonal relationships in periodic table	Lectures scientific discussion	Quiz Midterm exam. final exam.
1.2	List the chemical properties of hydrogen and its isotopes.	Lectures scientific discussion	Quiz Midterm exam. final exam.
1.3	Describe halides and state some chemical properties of lithium and magnesium and definition of the diagonal relationship between lithium and magnesium.	Lectures scientific discussion	Quiz Midterm exam final exam.
1.4	Recall of the chemical properties of beryllium and recognize the differences between it and second group elements	Lectures scientific discussion	Quiz Midterm exam final exam.
1.5	Define the p-block elements in their groups and recognize their properties.	Lectures scientific discussion E-learning	Quiz Midterm exam final exam. Quiz on blackboard
2.0	Skills		
2.1	Apply the definition of atomic and ionic size, ionization potential, electron affinity and electro-negativity to understand the periodic properties of main group (non-transition) elements.	lecture	Quiz Midterm exam final exam.
2.2	Compare between the horizontal, perpendicular and diagonal relationships in periodic table	lecture and discussion	Quiz Midterm exam final exam.
2.3	Evaluate the diagonal relationship between lithium and magnesium.	lecture	Quiz Midterm exam final exam.
2.4	Compare between beryllium and second group elements.	Lecture and web based study	Midterm exam and report
2.5	Use computers and internet to find all information related to main group elements and their compounds.	web based study.	Class discussion.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.0	Values		
3.1	Work individually to use the on-line libraries for searching and interpreting the course topics.	web based study	Class discussion.
3.2	Work collaboratively and constructively for searching and interpreting up to dated aspects relating to the properties and importance of main group elements and their compounds.	Library visits Web-based study A review about the application of groups with open discussion	Class discussion Activities Report submitted on blackboard

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments and activities	All weeks	10 %
2	E-learning	All weeks	10 %
3	Mid-term Exam	6	30 %
4	Final Exam (2 hours exam)	12	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	Quality committee and department Council
Reference No.	1 st meeting
Date	2021

Head of Chemistry Department



Dr Moataz Morad

