Course Specifications

Course Title:	General Chemistry 2
Course Code:	4022131-2
Program:	Chemistry
Department:	Department of Chemistry
College:	Faculty of Applied Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 3rd level / 2nd year
4. Pre-requisites for this course (if any)**:** General Chemistry 1
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** (specify); Quizzes and Exam 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 course deals with the basic concepts of general chemistry including Bohr theory of hydrogen atom, electronic structure of atoms, Lewis structures of compounds, theories of bonding, the principle quantum numbers, classification and properties of elements in the periodic table.

2. Course Main Objective

By finishing of this course, the students will be able to discuss and explain:

a. The atomic shells, their shapes and Bohr Theory of hydrogen atom.
b. Electronic structure and Lewis structures of different chemical compounds.
c. The valence shell electron pairs repulsion theory, molecular orbital theory and valence bond theory.
d. The principle quantum numbers, classification of elements and properties of ionic and covalent compounds.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Describe the atomic shells and their shapes.	**K3**
1.2	Write on classification of elements into periods and groups.	**K1**
1.3	List the properties of the elements inside the periods and groups.	**K3**
1.4	Memorize the valence shell electron pairs repulsion theory.	**K1**
1.5	Remember Bohr theory of hydrogen atom.	**K3**
2	**Skills :**	
2.1	Predict the type of hybridization in a chemical compounds.	**S1**
2.2	Compare between Lewis structures of different chemical compounds.	**S1**
2.3	Explicate bonding between atoms in light of different theories.	**S2**
2.4	Infer periodicity of the physical and chemical properties of the elements in the periodic table.	**S2**
2.5	Explains the different structures of inorganic compounds in light of valence shell electron pairs repulsion theory.	**S3**
2.6	Estimate the principle quantum numbers for different electrons.	**S4**
2.7	Operate in team work and accept his college's opinions.	**S8**
3	**Competence:**	

CLOs		Aligned PLOs
3.1	Develop the student's ability in self-reliance and responsibility.	C2
3.2	Communicate results and participate in discussions with his classmates.	C1
3.3	Builds a simplified diagram of molecular orbits and explain types of bonding through it.	C4
3.4	Apply computers and the international information network (the Internet) to perform calculations and to identify recent research relevant to decision sources.	C3

C. Course Content

No	List of Topics	Contact Hours
1	Electronic structure – atomic shells and their shapes.	2
2	Bohr theory of hydrogen atom.	2
3	Principle quantum numbers.	2
4	Properties of elements and the periodic table – classification of elements into periods and groups.	4
5	Comparison between some properties of the elements inside the period such as; ionization energy, electron affinity, electronegativity and atomic size.	4
6	Chemical bonds; their types and theories – Lewis symbols and structures.	4
7	Valence shell electron pairs repulsion theory.	2
8	Valence bond theory.	2
9	Hybridization and its types	2
10	Molecular orbital theory – octet rule.	4
11	Properties of ionic and covalent compounds.	2
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	Describe the atomic shells and their shapes.	Lecture and web based study.	Written exams
1.2	Write on classification of elements into periods and groups.	Lecture and scientific discussion	Written exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	List the properties of the elements inside the periods and groups.	Lecture and web based study.	Written exams
1.4	Memorize the valence shell electron pairs repulsion theory.	Lecture and library based study.	Written exams
1.5	Remember Bohr theory of hydrogen atom.	Scientific discussion and web based study.	Written exams
2.0	**Skills**		
2.1	Predict the type of hybridization in a chemical compounds.	Lecture and web based study.	Periodic tests and assignments.
2.2	Compare between Lewis structures of different chemical compounds.	Scientific discussion and library based activities.	Final exam and measuring the response to the assignments.
2.3	Explicate bonding between atoms in light of different theories.	Lecture and web based study.	Periodic tests and assignments.
2.4	Infer periodicity of the physical and chemical properties of the elements in the periodic table.	Scientific discussion and library based activities.	Final exam and measuring the response to the assignments.
2.5	Explains the different structures of inorganic compounds in light of valence shell electron pairs repulsion theory.	Lecture and web based study.	Periodic tests and assignments.
2.6	Estimate the principle quantum numbers for different electrons.	Scientific discussion and library based activities.	Final exam and measuring the response to the assignments.
2.7	Operate in team work and accept his college's opinions.	Homework and web-based studies in groups. .	Evaluate the results of collective works and duties as well as knowing the contribution of each individual through

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			dialogue and discussion.
3.0	**Competence**		
3.1	Develop the student's ability in self-reliance and responsibility.	Periodic individual duties.	Individual presentations.
3.2	Communicate results and participate in discussions with his classmates.	Periodic group duties.	Group presentations.
3.3	Builds a simplified diagram of molecular orbits and explain types of bonding through it.	Lecture and scientific discussions.	Periodic and final written exams.
3.4	Apply computers and the international information network (the Internet) to perform calculations and to identify recent research relevant to decision sources.	Web-based reports and studies related to general chemistry,	Assessment of individual tasks and duties.

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	- General Chemistry: The Essential Concepts 7th Edition by Raymond Chang Dr., Kenneth Goldsby Professor, 2013.
Essential References Materials	- Catherine Housecroft and Alan G. Sharpe Inorganic Chemistry, 4th ed. Pearson, 2012. - J. D. Lee, Concise Inorganic Chemistry, 5th ed., Wiley-Blackwell, 1998. - H. B. Gray. Chemical Bonds: An Introduction to Atomic and Molecular Structure, University Science Books, 1994.

Electronic Materials	• http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
Other Learning Materials	• Not required.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Well equipped lecture halls.
Technology Resources (AV, data show, Smart Board, software, etc.)	Room equipped with computer, data show and TV.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources	Students	Complete the questionnaire evaluation of the course periodically.
Effectiveness of teaching and assessment.	Program Leaders	Periodic review of final exams and the student's degrees in this course.
Extent of achievement of course learning outcomes.	Peer Reviewer	Checking selected exam papers, and student assignments.

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**