



Course Specifications

Course Title:	General Chemistry- 1
Course Code:	101CHEM-4
Program:	Bachelor of Science in Chemistry
Department:	Chemistry
College:	Science
Institution:	King Khalid University

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A. Course Identification

1. Credit hours:	4 (3+1)
2. Course type	
a.	University <input type="checkbox"/> College <input checked="" 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:	Level 1/ Year 1
4. Pre-requisites for this course (if any):	none
5. Co-requisites for this course (if any):	none

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	60 %
2	Blended		
3	E-learning		
4	Correspondence		
5	Other (practical course)	2	40 %

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	30
3	Tutorial	0
4	Others (specify)	0
	Total	75
Other Learning Hours*		
1	Study	30
2	Assignments	15
3	Library	15
4	Projects/Research Essays/Theses	0
5	Others (specify)	0
	Total	60

* 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

Detailed introduction to the basic principles and methods of chemistry, which are the foundation to all subsequent chemistry courses. This course surveys the metric system, scientific notation and significant figures, chemical formulas, chemical reactions and reaction stoichiometry, gases and gases laws, the atom and atomic structure, principles of chemical equilibrium, and fundamental of organic chemistry. Weekly laboratory experiments emphasize qualitative techniques and complement the lecture material.

2. Course Main Objective

Chemistry 101 is a general introduction to chemistry course that incorporates both lectures and laboratory experiments in developing and understanding chemical concepts and practices. After teaching of that course the students will able to:

- Understand the chemistry concepts.
- Differentiate between different types of matter.
- Identify the properties of gases, liquids and solids, intermolecular forces in liquids and solids.
- Explain the law of conservation of mass, the law of definite composition, and the law of multiple proportions.
- Perform mathematical operations involving significant figures.
- Summarize the essential points of atomic theories and describe the electronic configuration.
- Gain fundamental knowledge about the properties of solutions and chemical equilibrium.
- Identify a brief introduction to organic chemistry and natural molecules.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Outline the basis of the general chemistry, describe the atomic structure, periodic table, chemical equilibrium, solution concentration and colligative solution.	K1, K2
1.2	To identify the properties of gases, liquids and solids, intermolecular forces in liquids and solids	K3
2	Skills :	
2.1	To apply scientific notation, determining the accuracy of measurements, and observing the laws of moral numbers when making calculations containing measured quantities.	S1
2.2	To acquire knowledge of organic compounds and natural molecules	S1
2.3	To practice mathematical operations related to chemical reactions, molecular formula and conversion of mass.	S1, S3
2.4	Dealing with chemicals through the application of safety measures explain data from results of chemical analysis and write report.	S1, S2, S3, S4
3	Competence:	
3.1	To learn scientific method and discuss issues by asking questions and answering them.	C1, C2

CLOs		Aligned PLOs
3.2	To acquire self-reliance in the work of homework and self-study.	C2, C3
3.3	To use computer at the solution of homework	C2, C3
3.4	To work effectively in diverse teams in laboratory sessions and acquire practical skills	C1, C2, C3, C4

C. Course Content

No	List of Topics	Contact Hours
1	Matter – Its Properties and Measurements: Types of Matter, Quantities and SI-units, Uncertainty and Significant Figures.	3
2	Chemical Compounds: Atoms and Isotopes, Atomic Mass, The Mole and The Avogadro's constant, Molecular Mass, Empirical Formula, Chemical Equations and Stoichiometry	9
3	Atoms and the Atomic Theories, nomenclature of inorganic compounds Properties of Light, Quantum Theory, Bohr's Model, Wave-Particle Duality, Uncertainty Principle, Quantum Numbers, Electronic Configuration.	9
4	Gases: Properties of Gases, The Simple Gas Laws, The Ideal Gas Equation and The General Gas Equation, Mixtures of Gases, Dalton's Law of Partial Pressure, Graham's Law, Real Gas and van der Waals Equation.	6
5	Liquids, Solids and Intermolecular Forces: Properties of Liquids, Vaporization of Liquids, Vapor Pressure, Some Properties of Solids, Phase Diagrams, Van der Waals Forces, Hydrogen Bonding, Chemical Bonds.	6
6	Solutions and Their Physical Properties: Types of Solutions, Solution Concentration, Ideal Solutions and Non-ideal Solutions, Vapor Pressure of Solutions, Rault's Law, colligative properties.	6
7	Principles of Chemical Equilibrium: The Equilibrium Constant Expressions, Predicting the Direction of Net Change, Le Chatellier's Principle, Equilibrium Calculations Examples.	3
8	Organic Chemistry: Organic Compounds and Structures, Functional Groups. Types of organic reactions.	3
Total		45

Course Content (practical course):

No	List of Topics	Contact Hours
1	Identification the safety rules in laboratory	2
2	Identification the acidic radicals of the salts: group I (CO_3^{2-} , HCO_3^-) and group II (Cl^-)	2
3	Identification the acidic radicals of the salts: group II (Br^- , I^-).	2
4	Identification the acidic radicals of the salts: group III SO_4^{2-} , PO_4^{3-} .	2
5	Identification the basic radicals of the salts: group I (Ag^+ , Pb^{2+}) and group II (Cu^{2+} , Cd^{2+})	2
6	Identification the basic radicals of the salts group III (Al^{3+} , Fe^{3+} , Fe^{2+})	2
7	Identification the basic radicals of the salts group IV (Zn^{2+} , Ni^{2+} , Co^{2+})	2
8	Identification the basic radicals of the salts: group V (Ca^{2+} , Ba^{2+} , Sr^{2+}) and group VI (NH_4^+ , K^+ , Na^+)	2

9	Scheme for identification the acidic and basic radicals of the salts	2
10	Practice to identify the acidic and basic radicals of the salts	2
11	Determination the density of liquid and solid substances	2
12	Determination the viscosity of organic liquid	2
13	Revision	2
14	Revision	2
15	Exam.	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	Outline the basis of the general chemistry, describe the atomic structure, periodic table, chemical equilibrium, solution concentration and colligative solution.	Lectures, In class cooperative groups	Homework's Essay Questions. Multiple choice questions.
1.2	To identify the properties of gases, liquids and solids, intermolecular forces in liquids and solids	Lectures, In class cooperative groups	Homework's Essay Questions. Multiple choice questions.
2.0	Skills		
2.1	To applied scientific notation, determining the accuracy of measurements, and observing the laws of moral numbers when making calculations containing measured quantities.	Lectures, Problem solving	Homework's Essay Questions. Multiple choice questions.
2.2	To acquire knowledge of organic compounds and natural molecules	Lectures, In class cooperative groups	Homework's Essay Questions. Multiple choice questions.
2.3	To practice mathematical operations related to chemical reactions, molecular formula and conversion of mass	Lectures, Problem solving	Laboratory reports and exams.
2.4	Dealing with chemicals through the application of safety measures explain data from results of chemical analysis and write report.	Laboratory experiments	Laboratory reports and exams.
3.0	Competence		
3.1	To learn scientific method and discuss issues by asking questions and answering them.	Discussion during lectures	Fast questions. Short answer questions
3.2	To acquire self-reliance in the work of homework and self-study	Case study. Personal work	Electronic assignments
3.3	To use computer at the solution of homework	Personal work and Team Learning	Electronic assignments
3.4	To work effectively in diverse teams in laboratory sessions and acquire practical skills	Laboratory experiments Team Learning	Laboratory reports and exams.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-term exam(1)	7 th	10
2	Mid-term exam(2)	11 th	10
3	Homework	6 th and 10 th	5
4	Practical tests	15 th	25
5	Final exam	End of semester	50
	Total		100

*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:

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

Required Textbooks	ريموند تشانغ. الكيمياء العامة: المفاهيم الاساسية. الطبعة الأولى, مطبعة العبيكان, 2014. (Chang, Raymond. <i>General chemistry: the essential concepts</i> . First Edition, Obeikan Publishing, 2014. Arabic language)
Essential References Materials	Catherine E. Housecroft, Edwin C. Constable, <i>Chemistry: An Introduction to Organic, Inorganic and Physical Chemistry</i> , Third Edition, Pearson Education Limited, 2006. Theodore L. Brown, H. Eugene LeMay, Jr, Bruce E. Bursten, <i>Chemistry: The Central Science</i> , tenth Edition, Pearson Education, Inc., 2006.
Electronic Materials	Saudi digital Libarary
Other Learning Materials	Power point – Projector

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom (50 students)/ 3 hours (per week) Laboratories (25 students)/ 2 hours (per week)
Technology Resources (AV, data show, Smart Board, software, etc.)	Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Chemistry Laboratory and Chemicals

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	Reports and workshops
	Program Leader	Meetings
Course contents (update)	Departmental Plan and curriculum committee; external reviewers	Reports 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

Council / Committee	Department Council
Reference No.	1/22/1442
Date	15-9-1442