

T-104

Course Specification

Course Title:	General Chemistry
Course Code:	CHEM 1413-4
Program:	Bachelor Degree in Engineering
Department:	Joint Program/ Science
College:	Science
Institution:	King Khalid University
Version:	7
Last Revision Date:	26-03-2023

Table of Contents:

Content	Page
I. General Information about the course	15
1. Teaching mode(mark all that apply)	15
2. Contact Hours (based on the academic semester)	15
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	16
C. Course Content	5
D. Student Assessment Activities	7
E. Learning Resources and Facilities	8
1.References and Learning Resources	8
2. Required Facilities and Equipment	8
F. Assessment of Course Quality	9
G. Specification Approval Data	9

A. General information about the course:

Course Identification	
1. Credit hours:	5 (4+1)
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input 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 / First year
4. Course general Description	
General Chemistry (107Chem-6) is a general introduction to chemistry course that incorporates both lectures and laboratory experiments in developing and understanding chemical concepts and practices.	
5. Pre-requirements for this course (if any): None	
6. Co- requirements for this course (if any): None	
7. Course Main Objective(s)	
<ul style="list-style-type: none"> This course aims to introduce students the basic knowledge and principle in general chemistry. The course mainly emphasizes on matters, its properties and measurements, Atoms and the Atomic Theory, Mass Relations in Chemistry, Electronic Structure of Atoms, molecular geometry. Properties of solid, liquid and gases Developing the student's special abilities in chemistry. Help students to acquire the skill in chemistry using laboratory. 	

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
	Traditional classroom	6	100
	E-learning		
	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
26.	Lectures	48
27.	Laboratory/Studio	24
28.	Field	
29.	Tutorial	
30.	Others (specify)	
	Total	72

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	To demonstrate the matters and measurement	K1 and K2	Each lecture emphasis the concept to be covered and the	Mid-term exams, final exam, homework, quizzes and discussions.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			details of this concept.	
1.2	Recognize the fundamental principles and concepts of atom, molecule and ions and applications related to this course.	K1 and K2	Lectures. Discussions in lectures and try to engage students	Mid-term exams, final exam, homework, quizzes and discussions
1.3	Summarize the trends and patterns in the context of the periodic table.	K1	Lectures. Many problems to be discussed and solved by the students.	Mid-term exams, final exam, homework, quizzes and discussions.
1.4	Compare between solid, liquid and gases and factors affecting	K4 and K5	Lectures Many problems to be discussed and solved by the students.	Mid-term exams, Final exam, homework, quizzes, discussions.
2.0	Skills			
2.1	To apply the basic principles of periodic law to predict their various trends	S4	Different web sites on the internet explain the atomic structure Many text books in library demonstrate the importance of compounds	Mid-term exams and final exam including some questions such as (Explain, discuss, comment, compare, etc)
2.2	To apply fundamental principle for the identification the matter, types of matter, atomic structure etc	S4	Explain different examples of matter	Mid-term exams and final exam including some questions such as (Explain, discuss, comment, compare, etc)
3.0	Values, autonomy, and responsibility			
3.1	To present self-teaching for the students and research on the internet	V2, V3 and V4	Homework depending on search in the internet	Evaluation of the homework
3.2	To present an oral explanation for a subject in the area.	V2, V3 and V4	Case study depending on search in the internet	Evaluation
3,3	To show independency for solving problems.	V2	Case study depending on search in the internet	Evaluation

C. Course Content

No	List of Topics	Contact Hours
25.	• Matter - Its Properties and Measurements: Types of Matter, Quantities and SI-units, Uncertainty and Significant Figures.	8
26.	• Atoms and the atomic theory, Dalton's theory, Modern view of atomic structure, Isotopes, Introduction to the periodic table, Molecular Formula, Empirical or Simplest Formula, Structural Formula, Formula of ionic compounds.	8
3.	Mass Relations in Chemistry: Mole, Molecular Mass, Simplest Formula from Chemical analysis, Molecular Formula from Simplest Formula and Mass Relations in Reactions.	8
4.	• Electronic Structure of Atoms: Electromagnetic Radiation, The Quantum Theory, Bohr's Theory, De-Broglie Principal, The Modern Theory of Atomic Structure, Pauli Exclusion Principle, Hund's Rule, Electronic Configuration, Isoelectronic, Trends in the Properties of Atoms in Periodic Table, Atomic Radius, Ionic Radius of ions, Ionization Energy, Electronegativity.	8
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 as Intermolecular Forces.	8
6.	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.	4
7.	Covalent bonding, Lewis structures, octet rule, molecular geometry.	4
Total		48
No	List of Topics (Practicals)	Contact Hours
1.	List of topics (Practical)	2
2.	• Identification the safety rules in laboratory	2
3.	• Determination the density of liquid and solid substances	2
4.	• Determination the viscosity of organic liquid	2
5.	• Identification the basic radicals of the salts	2
6.	• Scheme for identification the acidic and basic radicals of the salts	2
7.	• Preparation of sodium carbonate (Na ₂ CO ₃) and sodium bicarbonate (NaHCO ₃) solutions	2
8.	• Separation of a mixture containing NaCl, SiO ₂ , and (NH ₄) ₂ CO ₃	2
9.	• Determination the value of general gas constant (R)	2
10.	• Determination the molecular weight of volatile liquid	2
11.	• Revision	2
12.	• Exam	2
Total		24

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Homework-1	3	2.5
2	Homework-2	5	2.5
3	Quiz	6	5
4	Midterm exam	7 or 8	25
5	Practical	12	25
6	Final exam	13	40

* Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Catherine E. Housecroft, Edwin C. Constable, "Chemistry: An Introduction to Organic, Inorganic and Physical Chemistry", 3 rd Ed., Pearson Education Limited, 2006. Theodore L. Brown, H. Eugene LeMay, Jr, Bruce E. Bursten, "Chemistry: The Central Science", 10 th Ed., Pearson Education, Inc., 2006
Supportive References	Ralph H. Petrucci, William S. Harwood, and F. Geoffrey Herring, "General Chemistry, Principles and Modern Applications", 10 th Edition, Prentice Hall, 2009.
Electronic Materials	Electronic references - web sites
Other Learning Materials	Power point - Projector

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class room, laboratory with equipment.
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	none

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student Peer Reviewer	Indirect Indirect
Effectiveness of students assessment	Academic Development and Quality Committee Peer Reviewer	Indirect Indirect
Quality of learning resources	Student Program Leader	Indirect Indirect
The extent to which CLOs have been achieved	Faculty	Direct
Other	Student Peer Reviewer	Indirect Indirect

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Committee of Curriculum and Plans
REFERENCE NO.	Committee of Academic Development and Quality
DATE	Departmental Council