Course Specification
(Bachelor)

Course Title:	**General Chemistry**
Course Code:	**CHM 1104**
Program:	**Bachelor of Industrial Engineering, Chemical Engineering, Architecture Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering**
Department:	**Chemistry**
College:	**Science**
Institution:	**Imam Mohammed Ibn Saud Islamic University**
Version:	**1**
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3(3, 1, 0)					
3 (3 Lect, 1 Toturial, 0 Lab)					
2. Course type					
A.	☐University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: Level 8/ 4th year					
4. Course general Description:					
The course covers fundamental observations, laws, and theories of chemistry at the introductory level. Topics include Atoms/Molecules, Stoichiometry, Acids/Bases, Solutions, Equilibria, Gases, Solids, Liquids, Thermodynamics, Kinetics, Quantum Theory, The periodic table, and Chemical bonding.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					

After completing of this course, the students will have knowledge on:

- **Matter, atoms, molecules and chemical structure**
- **Chemical reaction calculations**
- **The properties of solutions and gases**
- **Periodic table and its properties**
- **Acidity and basicity in solutions**
- **Chemical equilibrium and kinetics**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	15
5.	**Others (specify)**	0
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	To memorize principles of chemistry that belong to the major fields of chemistry including physical, organic, inorganic, analytical, and biochemistry.	K3	Exams, quiz, homework	Short quizzes and exams
1.2	To name inorganic compounds using the IUPAC system of nomenclature	K1	Exams, quiz, homework	MCQs Exams
2.0	Skills			

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	To conduct the basic stoichiometric calculations	S2	Exams, quiz, homework	•Solved problem marks •Short quizzes •Numerical problem
2.2	To analyze the structures, physical and chemical properties and functions of various kinds of molecules	S2, S3	Exams, quiz, homework	•Work portfolio and homework
2.3	To Explain basic concepts of chemical kinetics and chemical thermodynamics	• S2, S3	Exams, quiz, homework	•Presentation marks •Oral tests, assignments marks and homework
3.0	**Values, autonomy, and responsibility**			
3.1	To appraise coordination in teamwork and raise Knowledge during various evaluations, initiatives to uphold scientific integrity.	V1, V2	•Group discussions and assignment. •Homework • •Mini-reports	•Oral presentation marks. • •Assessments and homework marks

C. Course Content

No	List of Topics	Contact Hours
1.	Matter and Measurement • The study of chemistry • Classifications of matters • Properties of matters • Units of measurements • Uncertainty in measurements=	8
2.	Atoms, Molecules, and Ions • The atomic theory • The discovery of atomic structure • Atomic structure • Atomic weight	12

	• The periodic table • Molecules and Ionic compounds	
3	**Stoichiometry: Calculations with Chemical Formulas and Equations** • Chemical Equations • Chemical reactivity • Formula weight • Avogadro's number and the mole • Empirical formula • Stoichiometry • Limiting reactants	8
4	**Aqueous Reactions and Solution Stoichiometry** • Aqueous solution • Precipitation reactions • Acid-Base reactions • Oxidation – reduction reactions • Solutions; chemical analysis	12
5	**Acid-Base Equilibria** • Brønsted-Lowry Acids & Bases • The Autoionization of Water • The pH – Scale • Strength of Acids & Bases • Weak Acids • Weak Bases	12
6	**Thermochemistry** • Nature of Energy • First law of thermodynamics • Enthalpy • Enthalpies of reactions • Calorimetry • Hess's law • Enthalpies of formation	8
Total		60

Topics to be covered (Laboratories)

No	List of Experiments	Contact hours
	None	

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam 1	6-7 th week	20 %
2.	Midterm Exam 2	11- 12 th week	20 %
3.	Quizzes, Home Works, class participation, and mini projects	During the semester	20 %
4.	Final Exam	16-17th week	40 %
5.	Total		100%

*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	• CHEMISTRY, T. Brown, H. Lemay Jr., B. Bursten and C. Murphy, Pearson International Edition, 11th Edition, 2009
Supportive References	• CHEMISTRY, Raymond Chang McGraw-Hill, 9th Edition, 2007.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Each of the class room should be equipped with a whiteboard and a projector, with a maximum of 20 students. •
Technology equipment (projector, smart board, software)	• The rooms are equipped with data show, Smart Board, WI-FI access.
Other equipment (depending on the nature of the specialty)	• none

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct: Questionnaire.
	Course Responsible	Direct: Course e-Portfolio. Indirect: Second examiner checklist-Course report.
	Peer Reviewer	Direct: Questionnaire. Indirect: External assessor report.
Effectiveness of Students assessment	Program Leaders	Direct: Course e-Portfolio. Indirect: Course report.
Quality of learning resources	Students	Indirect: Second examiner checklist-Course report.
	Faculty (Academic Advisory)	Direct: course Entrance/Exit. Indirect: Observations - Accreditation review.
	Program Leaders	Direct: Course e-Portfolio. Indirect: Course evaluation survey- Observations- Syllabus review- Accreditation review.
The extent to which CLOs have been achieved	Course Responsible	**Direct:** Exams - Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Program Leaders	**Indirect:** Exams.
Lab Performance	None	None

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**COUNCIL OF DEPARTMENT OF CHEMISTRY**
REFERENCE NO.	**7 (NO. 2/3)**
DATE	**29/3/1446 - 2/10/2024**