

Course Syllabus

1	Course title	General chemistry 1 for life sciences
2	Course number	0343103
3	Credit hours	3 Hours
	Contact hours (theory, practical)	(3,0)
4	Prerequisites / corequisites	
5	Program title	Bachelor degree in agriculture
6	Program code	03
7	Awarding institution	The University of Jordan
8	School	Science
9	Department	Chemistry
10	Course level	1st year
11	Year of study and semester (s)	Fall 2024/2025
12	Other department(s) involved in teaching the course	N/A
13	Main teaching language	English
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
16	Issuing/Revision Date	

17 Course Coordinator:

Name:	Contact hours:
Office number:	Phone number:
Email:	

18 Other instructors:

--

19 Course Description:

General chemistry 1 for life sciences is an introductory course intended for first year university students from Agriculture Faculty. It covers basic topics including: the scientific method, measurements and significant figures, units and dimensional analysis, atoms, molecules, and ions, calculations with chemical formulas and equations, chemical reactions, states of matter and properties of solutions, chemical kinetics and rate of reactions, chemical equilibrium and acids and bases.

20 Course aims and outcomes:

A- Aims:

1. To instill in students a sense of enthusiasm for chemistry, an appreciation of its application in different contexts and to involve them in a satisfying experience of learning and studying.

2. To provide students with a broad and balanced foundation of chemical knowledge.
3. To develop in students the ability to apply their chemical knowledge and skills to the solution of theoretical problems in chemistry.
4. To develop in students, through an education in chemistry, a range of transferable skills, in chemical and allied chemical employment related to course content.
5. To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of chemistry or multi-disciplinary areas involving chemistry.

B- Course Learning Outcomes (CLOs): Upon successful completion of this course students will be able to:

Part-1: Chemistry and Measurement

- Classify the properties of matter
- Identify physical and chemical properties of matter
- Report measurements properly
- Apply dimensional analysis involving two or more properties

Part-2: Atoms, Molecules, and Ions

- Explain the postulates of Dalton's atomic theory
- Apply the results of early atomic experiments to define the three subatomic particles and isotopes
- Interpret the atomic structure and determine atomic mass and define isotopes
- Express chemical formulas in molecular, empirical, and structural form
- Derive names for common types of compounds using a systematic approach
- Write and balance chemical equations

Part-3: Calculations with Chemical Formulas and Equations

- Relate formula mass, moles, and the numbers of atoms or molecules
- Determine empirical and molecular formulas, determine mass percentage for each element
- Determine amounts of reactants and products in a reaction. Recall the concept of limiting reactant
- Calculate theoretical and percent yield

Part-4: Chemical Reactions

- Classify matter to electrolytes and non-electrolytes. Predict the solubility of ionic compounds in water
- Classify chemical reactions in solutions
- Use molarity to calculate solution concentrations and perform dilution calculations
- Describe titrations and gravimetric data and apply stoichiometry to both
- Determination of oxidation number for atoms in substances in redox reactions

Part-5: States of matter and properties of solutions

- Classify the states of matter and their phase transitions
- Identify the properties of liquids
- Classify the intermolecular interactions and the relation with the liquid properties
- Identify the properties of solutions
- Identify the colligative properties

Part-6: Chemical kinetics and rate of reactions

- Definition of reaction rates
- Determine the factors that affect the rate of a reaction
- Apply Arrhenius equation
- Relate the reaction mechanism with the rate of the reaction

Part-7: Chemical equilibrium

- Describing the chemical equilibrium
- Using equilibrium constant
- Identifying the changes that occur on chemical equilibria

Part-8: Acids and bases

- Defining the acid and base concepts
- Determining the acid and base strengths
- Describe the autoionization of water

- Identify the pH value of solutions

Part-9: acid-base equilibria

- Defining weak acids and bases
- Identifying the common ion and its effect
- Apply equilibrium equation for buffer solutions

Part-10: Solubility and Complex-Ion Equilibria

- Define the solubility product constant
- Validate the solubility and the effect of common ions.

-
-

CLO \ SO	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)
1	X						
2	X	X			X		
3	X	X			X		
4	X	X	X		X		
5	X	X	X		X		
6	X	X	X		X		
7	X	X	X		X		
8	X	X	X		X		
9	X		X		X		
10	X		X		X		

21. Topic Outline and Schedule:

Week	Lecture	Topic(s)	Teaching Methods/platform	Evaluation Methods	References
1	1.1	1.1 Modern Chemistry 1.2 Experiment and Explanation	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	1.2	1.3 Law of Conservation of Mass 1.4 Matter: Physical State and Chemical Composition 1.5 Measurement and Significant Figures	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	1.3	1.6 SI Units 1.7 Derived Units 1.8 Units and Dimensional Analysis	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
2	2.1	2.3 Nuclear Structure and Isotopes 2.4 Atomic Weights	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	2.2	2.8 Naming Simple Compounds	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	2.3	2.9 Writing Chemical Equations	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
3	3.1	2.10 Balancing Chemical Equations.	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	3.2	3.1 Molecular Weight and Formula Weight 3.2 The Mole Concept	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	3.3	3.3 Mass Percentages from the Formula 3.4 Elemental Analysis: Percentages of Carbon, Hydrogen, and Oxygen	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
4	4.1	3.5 Determining Formulas	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1

		3.6 Molar Interpretation of a Chemical Equation			
	4.2	3.7 Amounts of Substances in a Chemical Reaction	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	4.3	3.8 Limiting Reactant, Theoretical and Percentage Yields	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
5	5.1	4.1 Ionic Theory of Solutions and Solubility Rules	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	5.2	4.2 Molecular and Ionic Equations 4.3 Precipitation Reactions	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
	5.3	4.4 Acid-Base Reactions 4.5 Oxidation-Reduction Reactions	In the class	Written exam	Darrel Ebbing and Steven gammon, General Chemistry, 11th ed. Ch 1
6	6.1	11.1 Comparison of Gases, Liquids, and Solids, 11.2 Phase Transitions	In the class	Written exam	
	6.2	11.3 Phase Diagrams	In the class	Written exam	
	6.3	11.3 Phase Diagrams-cont	In the class	Written exam	
7	7.1	11.4 Properties of Liquids: Surface Tension and Viscosity	In the class	Written exam	
	7.2	11.5 Intermolecular Forces: Explaining Liquid Properties.	In the class	Written exam	
	7.3	12.1 Types of Solutions, 12.2 Solubility and the Solution Process	In the class	Written exam	
8	8.1	12.3 Effects of Temperature and Pressure on Solubility, 12.4 Ways of Expressing Concentration	In the class	Written exam	
	8.2	12.5 Vapor Pressure of a Solution, 12.6 Boiling-Point Elevation and Freezing-Point Depression	In the class	Written exam	
	8.3	12.7 Osmosis, 12.8 Colligative Properties of Ionic Solutions	In the class	Written exam	
9	9.1	13.1 Definition of Reaction Rate, 13.2 Experimental Determination of Rate	In the class	Written exam	
	9.2	13.3 Dependence of Rate on Concentration, 13.4 Change of Concentration with Time	In the class	Written exam	
	9.3	13.5 Temperature and Rate, Collision and Transition-State Theories, 13.6 Arrhenius Equation	In the class	Written exam	
10	10.1	13.7 Elementary Reactions, 13.8 The Rate Law and the Mechanism	In the class	Written exam	
	10.2	13.9 Catalysis.	In the class	Written exam	
	10.3	14.1 Chemical Equilibrium-A Dynamic Equilibrium, 14.2 The Equilibrium Constant	In the class	Written exam	
11	11.1	14.3 Heterogeneous Equilibria: Solvents in Homogeneous Equilibria, 14.4 Qualitatively Interpreting the Equilibrium Constant	In the class	Written exam	
	11.2	14.5 Predicting the Direction of Reaction, 14.6 Calculating Equilibrium Concentrations	In the class	Written exam	
	11.3	14.7 Removing Products or Adding Reactants, 14.8 Changing the Pressure and Temperature	In the class	Written exam	
12	12.1	14.9 Effect of a Catalyst.	In the class	Written exam	
	12.2	15.1 Arrhenius Concept of Acids and Bases, 15.2 Bronsted-Lowry Concept of Acids and Bases	In the class	Written exam	
	12.3	15.3 Lewis Concept of Acids and Bases, 15.4 Relative Strengths of Acids and Bases	In the class	Written exam	
13	13.1	15.5 Molecular Structure and Acid Strength, 15.6 Autoionization of Water	In the class	Written exam	
	13.2	15.7 Solutions of a Strong Acid or Base, 15.8 The pH of a Solution.	In the class	Written exam	
	13.3	16.1 Acid-Ionization Equilibria, 16.2 Polyprotic Acids	In the class	Written exam	
14	14.1	16.3 Base-Ionization Equilibria	In the class	Written exam	

	14.2	16.4 Acid–Base Properties of Salt Solutions	In the class	Written exam	
	14.3	16.5 Common-Ion Effect,.	In the class	Written exam	
15	15.1	16.6 Buffers	In the class	Written exam	
	15.2	17.1 The Solubility Product Constant,	In the class	Written exam	
	15.3	17.2 Solubility and the Common-Ion Effect, 17.3 Precipitation Calculations.	In the class	Written exam	

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLO	Period (Week)	Platform
Midterm exam	30	Topics covered in chapters 1+2+3+4	1+2+3+4	Week # 7	On campus computerized exam
Semester work exam	20	Topics covered in chapters 11+12+13	5+6+7	Weak # 11	On campus computerized exam
Final exam	50	All Chapters	1+2+3+4 +5+6+7+ 8+9+10	Final exams week	On campus computerized exam

23 Course Requirements

N/A

24 Course Policies:

A- Attendance policies:

Students should attend at least 85% of the total number of the lectures.

B- Absences from exams and submitting assignments on time:

Students who miss an exam must submit an acceptable excuse and then a makeup exam will be appointed.

C- Health and safety procedures:

Followed according to university regulations.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Followed according to university regulations.

E- Grading policy:

1. Mid exam 30%
 2. Semester work 20%
 3. Final exam: 50%
- The letter grade scale is adopted.

F- Available university services that support achievement in the course:

Central library, personal computer labs at different locations in the university, e-learning site, faculty member's website.

--

25 References:

A- Required book (s), assigned reading and audio-visuals: General Chemistry, 11 th ed., D. Ebbing & S. Gammon, Brooks Cole, 2017.
B- Recommended books, materials, and media: 1) Chemistry, 9 th ed., S. Zumdahl & S. Zumdahl, Brooks Cole, 2013. 2) 2. General Chemistry, The essential concept, 7 th ed., R. Chang, McGraw-Hill, 2016.

26 Additional information:

This course is required by almost all students in scientific faculties at the University of Jordan. The number of students registered in general chemistry 1 (0303101) course in Fall 2021/2022 is was ~5000 student distributed on 61 sections.
--

Name of Course Coordinator: -----Signature: ----- Date: -----
Head of Curriculum Committee/Department: ----- Signature: -----
Head of Department: ----- Signature:-----
Head of Curriculum Committee/Faculty: ----- Signature: -----
Dean: ----- Signature: -----