

Identification	Subject	CHEM 102 Chemistry , 6 ECTS		
	Department	Chemistry and Chemical Engineering		
	Program	Undergraduate		
	Term	Fall 2026		
	Instructor	Gunay Hajiyevea		
	E-mail:	gunay.hajiyevea@khazar.org		
Prerequisites				
Language	English			
Compulsory/Elective	Compulsory			
Required textbooks and course materials	Core textbooks 1. General Chemistry (5th edition) by Raymond Chang pdf published in 2008 2. Chemistry (13th edition) by Raymond Chang and Jason Overby in pdf published in 2019 3. Chemistry The Central Science 14th Edition published in 2017			
Website of course	This course is based on traditional face-to-face classes			
Teaching methods	Lecture	X		
	Group discussion	X		
	Practical tasks	X		
	Research from internet	X		
	Others	X		
Evaluation	Methods	Date/deadlines	Percentage (%)	
	Midterm exam	November	30	
	Quizzes	Each month	10	
	Presentation\Group work	Last week of December	5	
	Activity	Every lesson	10	
	Attendance	Every lesson	5	
	Final exam	End of the semester	40	
	Total		100	
Description	The General Chemistry course is designed to introduce students to the fundamental principles of chemistry, atomic and molecular structure, the foundations of chemical reactions, and the properties of matter. The course provides students with a comprehensive understanding of the fundamental laws of chemistry, the structure of matter, and its physical and chemical properties. The course covers major topics including atomic structure, the periodic table, chemical bonding, stoichiometry, thermochemistry, chemical equilibrium, acids			

	and bases, electrochemistry, and chemical kinetics. Students will acquire theoretical knowledge while developing practical skills through laboratory experiments, with particular emphasis on chemical analysis methods and laboratory techniques. The course also aims to demonstrate the applications of chemistry in various fields, including the natural sciences, engineering, medicine, and pharmaceutical sciences. Through theoretical instruction and practical activities, students will develop scientific reasoning, analytical thinking, and problem-solving skills.
Course objectives	The main objectives of the course are to: • Provide a foundation in the fundamental principles of chemistry – Introduce and explain key concepts, including atomic and molecular structure, the periodic table, chemical bonding, and chemical reactions. • Develop an understanding of the nature of chemical reactions – Examine the interactions between substances and develop an understanding of stoichiometry, thermochemistry, chemical equilibrium, and reaction kinetics. • Develop applied chemical knowledge – Demonstrate the role and applications of chemistry in pharmaceutical sciences, biomedicine, engineering, and environmental sciences. • Strengthen critical thinking and problem-solving skills – Develop students' ability to solve chemical problems and apply chemical principles and approaches to real-world scientific and practical challenges.
Learning outcomes	Upon successful completion of this course, students will be able to demonstrate the following knowledge and skills: 1. Knowledge and Understanding • Explain the fundamental concepts related to the structure of matter and the electronic structure of atoms and molecules; • Describe and compare different types of chemical bonding, including ionic, covalent, metallic, and hydrogen bonding; • Explain the major types of chemical reactions and their underlying mechanisms; • Explain the fundamental concepts of thermochemistry, chemical kinetics, and chemical equilibrium in relation to the relevant chemical laws and principles. 2. Analysis of Chemical Reactions • Write and balance chemical equations accurately; • Perform quantitative calculations involving chemical substances, including the mole concept, molar mass, and gas laws; • Analyze the factors affecting the rate of chemical reactions. 3. Applications of Chemistry • Relate the knowledge acquired in General Chemistry to environmental processes and phenomena encountered in everyday life;

	- Explain the physical and chemical properties of substances and their changes under different conditions. 4. Critical Thinking and Problem-Solving - Solve chemical problems using a logical and systematic approach; - Compare alternative approaches to solving chemical problems and select the most appropriate or effective solution.
Policy	Activity Activity points serve as a measure of student engagement, participation, and understanding of fundamental concepts. They encourage active involvement in discussions, experiments, and problem-solving exercises, helping students grasp key principles more effectively. These points also contribute to overall grades, fostering consistent learning and collaboration. It should be noted that if a student refuses to solve problems on the blackboard, answer oral questions, or complete any other assigned tasks, the corresponding activity points will be deducted. Quiz A consistent method of measuring your understanding of the content covered in class is through quizzes. They assist you and your teacher in evaluating your comprehension of important ideas and identifying any areas that can benefit from more explanation. Quizzes can be considered as “preparation” for the exams. Quizzes will be held three times (or twice) during the semester and will account for a total of 15 points. Each quiz will be conducted during class and will be worth approximately 5 (or 7–8) points. Students are allowed to use a calculator during quizzes; however, the use of mobile phones, tablets, laptops, books, and notes is not permitted. Note: Except in certain circumstances, students are required to participate in quizzes. In case of a valid excuse, students must inform the instructor in advance so that a make-up quiz can be arranged. Presentation\Group work Presentation/Group Work consists of students researching a specific topic, preparing a PowerPoint presentation, presenting it face-to-face in class, and answering the questions provided by the instructor. It should be noted that presentations must be delivered in English, as this is an English-medium Chemistry course. The maximum score for the presentation/group work is 10 points. Midterm Exam Midterm exam is important components of the academic assessment process, and it serves several crucial purposes in a student's educational journey. Midterms are held in the middle of the semester and is evaluated with a total of 30 points. The time limit of midterm exams is 90 minutes. The format of the questions will vary but expect a range of ‘easy’, ‘medium’ and ‘challenging’ parts, with the point values for each question/part clearly labeled. During the exam, you are permitted to use a

	calculator (any model, provided that it has no communication ability; you also may not share calculators). The use of other electronic devices during the exam is strictly prohibited. Withdrawal (pass/fail) The School of Engineering and Applied Science's grading guidelines are carefully adhered to throughout this course. In order to pass, a student must typically receive a mark of at least 60%. Cheating/plagiarism Any form of plagiarism or cheating on a quiz, project or exam paper will result in the cancellation of the assignment. In this scenario, the student will receive a score of zero (zero) without any further consideration. Professional behavior guidelines During class hours, students are expected to conduct themselves in a way that fosters a positive academic and professional atmosphere. Discussions without permission and unethical conduct are absolutely forbidden. Ethics During class, students are expected to arrive on time, refrain from eating or drinking anything other than water, avoid talking to each other, and refrain from any behavior that may interrupt the lesson or distract the instructor or other students. All electronic devices must be put away and turned off during class. Failure to comply with these rules may result in appropriate penalties.
Use of Artificial Intelligence Tools	The use of Generative Artificial Intelligence (GAI) tools within this course is permitted solely for educational, research, and individual learning purposes and must remain consistent with the University's principles of academic integrity. GAI tools may be used as supplementary resources to support learning and research; however, all submitted work must reflect the student's own understanding, critical thinking, and academic contribution. Any use of GAI must be appropriately disclosed in the relevant assignment, project, presentation, or other academic material. Students are fully responsible for evaluating and verifying the accuracy, reliability, and appropriateness of all AI-generated content included in their work.

	Tentative Schedule (Can be changed)	
Weeks	Topics	Reference books
1	Introduction to General Chemistry, Scope and subject of chemistry, matter and its motion, fundamental stoichiometric laws of chemistry	[1] Pages 2-25
2	Structure of Matter, Models of atomic structure, quantum numbers, electronic structure of atoms	[1] Pages 41-71
3	Periodic Law and the Periodic Table of Elements, Periodicity of the properties of chemical elements	[1] Pages 293-318
4	Chemical Bonding, Types of chemical bonds, the octet rule	[1] Pages 328-359
5	States of Matter	[1] Pages 418-463
6	Gases and Gas Laws	[1] Page 175-210
7	Midterm Exam	
8	Intermolecular Interactions, Van der Waals forces and hydrogen bonding	[1] Pages 230-258
9	Coordination Compounds, Isomerism in coordination compounds and the nature of chemical bonding	[1] Pages 946-954
10	Thermochemistry	[1] Pages 223-249
11	Solutions, Distribution law and extraction	[1] Pages 478-509
12	Chemical Kinetics, Reaction rates, the van 't Hoff rule, elementary and complex reactions, catalysis	[1] Pages 366-384
13	Chemical Equilibrium, Le Châtelier's principle	[1] Pages 513-541
14	Acid–Base Equilibria, pH, buffer solutions, and hydrolysis	[1] Pages 513-541
15	Oxidation–Reduction Processes and Electrolysis	[1] Pages 410-440
	Final exam	