Identification	**Subject**	CHEM112, Chemistry 2, 6 ECTS
	Department	Chemistry and Chemical Engineering
	Program	Undergraduate
	Term	Spring 2026
	Instructor	Tahir Javadzade
	E-mail:	tjavadzade@khazar.org
	Phone	
	Classroom/hours	TBC
	Office hours	Monday to Friday 09:30-17:30
Prerequisites		
Language	English	
Compulsory/ Elective	Compulsory	
Required textbooks and course materials	**Main:** • Chemistry: A Molecular Approach by Nivaldo J. Tro in pdf published in 2019 [1] • Chemistry: The Central Science" by Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. pdf published in 2011 [2] • Nanochemistry:Chemistry of Nanoparticle Formation and Interactions by Anna Klinkova, Héloïse Thérien-Aubin pdf published in 2023 [3] **Extra**: • Chemistry: An Introduction to General, Organic, and Biological Chemistry by Karen C. Timberlake.2024. [4] • General Chemistry: Principles and Modern Applications" by Ralph H. Petrucci, William S. Harwood, and F. Geoffrey Herring.2023. [5] • Chemistry: An Introduction to General, Organic, and Biological Chemistry" by Karen C. Timberlake.2019. [6] • Chemistry: The Molecular Nature of Matter and Change" by Martin Silberberg and Patricia Amateis. 2017. [7] • Chemical Principles: The Quest for Insight" by Peter Atkins, Loretta Jones, and Leroy Laverman.2016.[8] • Fundamentals of General, Organic, and Biological Chemistry" by John McMurry, David Ballantine, Carl Hoeger, and Virginia Peterson.2016. [9]	
Website of course	This course is based on traditional face-to-face classes.	
Teaching methods	**Lecture**	**X**
	Group discussion	**X**
	Practical tasks	**X**

Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Activity		5
	Quiz	2nd week of each month	15

	Midterm Exam	TBC	30
	Presentation/Group work	1st week of May	10
	Final Exam	TBC	40
	Total		100
Course outline	The course of Chemistry 2 covers fundamentals of chemistry, study of quantum theory and quantum mechanical model of atom. Besides periodic properties of the elements, students will learn Acid and Bases, preparation of buffer solutions and measurement method of it. Additionally, course covers Chemical Kinetics, Chemical Equilibrium, Thermodynamics, Radioactivity and Nuclear Chemistry Chemistry of Nanomaterials, Metals and Metallurgy, Coordination Compounds, Biochemistry and Electrochemistry.		
Course objectives	• General objective of the course: To meet curriculum requirements of the School of Engineering and Applied Sciences (SEAS). • Specific objectives of the course: To support student academically, to provide a strong foundations of Chemistry required for further studies requiring a strong Chemistry knowledge • To encourage students participation and interaction in scientific perspective		
Learning outcomes	By the end of the course the students should be able: • To perform fundamental Chemical calculations (Physical Chemistry) • To procure a fundamental knowledge in Inorganic Chemistry. • To achieve basic knowledge in Organic chemistry		
Policy	• **Participation** For a variety of reasons, participation in a classroom context is essential. It is essential to the learning process, promotes teamwork, and aids in the general success of both the individual students and the class as a whole. • **Presentation/Group work** Students frequently must explain difficult chemical ideas to their classmates when they work in groups or make presentations. As they must break it down into simpler terms and respond to inquiries from their classmates, teaching otherscan help students get a deeper knowledge of the content. • **Activity** The students should participate in the seminars, conferences, and other events related to their courses to build new connections between academic and non-academic institutions. Activity of the student in the lessons will play key point to get the full mark. • **Quiz** A consistent method of gauging 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. Each quiz will consist of 5-8 questions, and each question will be marked according to its difficulty. There will be three (four)quizzes. • **Withdrawal (pass/fail)** The School Science and Engineering grading guidelines are carefully adhered		

	to throughout this course. To pass, a student must typically receive a mark of at least 60%. If the student fails, the course. • **Cheating/plagiarism** Any form of plagiarism or cheating on a test, quiz, or project will result in the cancellation of the assignment. In this scenario, the student will receive a score of zero (zero) without any further consideration. • **Illness** Student with an illness may miss a quiz or presentation. This might be because the student needs to go to the hospital, recover at home, or attend regular medical appointments. In this case, the student must inform the instructor in advance about the illness and must present a document from their doctor. After considering the situation, the instructor may set a new date for the quiz or project presentation. Only one opportunity will be given to the student. The students who don't inform the instructor in advance will not be given a chance to retake the quiz or give a presentation. • **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** In class, students must not be late. During class, mobile phones must be put away and turned off.

Tentative Schedule		
Weeks	**Topics**	**Reference books**
1-2	Quantum theory and Quantum mechanical model of atom	[1] p. 310-350
3	Periodic properties of the elements	[1] p. 350-392 [2] p.248-288
4	Chemical Kinetics	[1] p. 630-682 [2] p.556-610
5	Chemical Equilibrium	[1] p.682-730 [2] p.610-650
6	Acid and Bases	[1] p.730-786 [2] p.650-702
7	Aqueous ionic equilibrium	[1] p.785-846 [2] p.702-730
8	Review **Midterm exam**	
9	Thermodynamics	[1] p.846-896 [2] p.784-826
10	Radioactivity and Nuclear chemistry	[1] p.946-988 [2] p.874-916
11	Chemistry of Nanomaterials	[3] p. 143-166

12	Metals and Metallurgy	[1] p.1108-1134
13	Coordination compounds	[1] p.1134-1160 [2] p.962-1004
14	Biochemistry	[1] p.1036-1070 [2] p.1004-1042
15	Electrochemistry	[1] p.896-946 [2] p.826-860
Final Exam		