

**Bachelor program,  
Chemical engineering (CHEN) program, “Chemistry and Inorganic substances technology”  
department**

<b>Course Unit Title</b>	General chemistry	
<b>Course Unit Code</b>	VTSS-B06	
<b>Type of Course Unit</b>	Compulsory	
<b>Level of Course Unit</b>	1 <sup>st</sup> cycle Bachelor	
<b>National Credits</b>	0	
<b>Number of ECTS Credits Allocated</b>	6	
<b>Theoretical (hour/week)</b>	2	
<b>Practice (hour/week)</b>	0	
<b>Laboratory (hour/week)</b>	2	
<b>Year of Study</b>	1	
<b>Semester when the course unit is delivered</b>	2	
<b>Course Coordinator</b>	Salmanova Nazila	
<b>Name of Lecturer (s)</b>	Salmanova Nazila	
<b>Name of Assistant (s)</b>	-	
<b>Mode of Delivery</b>	Face to Face	
<b>Language of Instruction</b>	English	
<b>Prerequisites</b>	-	
<b>Recommended Optional Programme Components</b>	-	
<b>Course description</b>		
<p>This subject, which plays the role of the main specialty in the training of specialists in "Device engineering ", is an organic, analytical, and physicochemical discipline, ecology, engineering basics of chemical technology, chemical industry processes and devices, automation and mathematical modeling of chemical technology processes, high molecular weight compounds. and the technology of obtaining monomers for the synthesis of high-molecular compounds in physics is based on the general laws, provisions and principles of the disciplines. Therefore, to master the subject and study it in depth, it is important for students to have sufficient theoretical knowledge and practical skills in the subjects of nature and fundamental, general vocational training of the direction</p>		
<b>Objectives of the Course</b>		
<p>The aim of the subject is formation of real comprehension of the world- scientific view of contemporary theories based on interrelation of nature laws and phenomena, systematization and deepening of students' knowledge in the field of General chemistry. The main goal of the subject in the process of training is to master theoretical and practical basis of General chemistry for its application in petroleum geology, solution of various ecological problems, analysis of water, soil, air and in chemical technology industr.</p>		
<b>Learning Outcomes</b>		
At the end of the course the student will be able to		Assessment
1.	Have information about the metals and alloys used in the device manufacturing process, master the corrosion protection methods of devices	1,3
2.	Use the acquired knowledge for its sufficient application at the conducting of research and laboratory works;	1,2,3
3.	Analyze a problem, identify inorganic substances;	2,3
4.	Develop and write model of inorganic molecule and equations of chemical reactions by means of computer programmes;	2,3
5.	Obtain some inorganic substance using initial components and identify it in laboratory conditions;	1,3
6.	Understand and exercise professional and ethical norms;	1,3
7.	Work productively in a multidisciplinary team;	2
8.	Apply fundamentals of general chemistry, main mechanisms and laws organic chemistry at designing of chemical processes;	1,3
9.	Apply the team skills trained in the internship	2,3
10.	Be able to keep abreast with the scientific literature, new technologies and new developments	2
Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm exam		
<b>Course's Contribution to Program</b>		

		CL	
1	Ability to develop as a specialist in the field of fundamental sciences and apply basic knowledge.	4	
2	Ability to Identify, formulate, and solve complex mechatronics engineering problems properly applying the principles, methods, techniques and tools of engineering, science, and chemistry.	3	
3	Ability to use the basics of mathematics, algorithmic principles and methods of computer engineering in the modeling and design of chemical engineering systems.	4	
4	Ability to analyse a problem, identify and define inorganic materials	5	
5	Ability to apply fundamentals of chemical technology, main mechanisms, and laws inorganic chemistry at designing of chemical processes	4	
6	Planning and carrying out experiments, analysing and interpretation of data	4	
7	Ability to use the techniques, skills, and modern laboratory tools necessary for a carrying out chemical experiments	1	
8	An understanding of professional, ethical, legal, security and social issues and responsibilities	3	
9	Ability to work productively in a team	4	
10	Apply principles of mechanical and electrical engineering to the practice of engineering, robotics, mechatronics, and related industries.		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
<b>Course Contents</b>			
Week	Chapter	Topics	Exam
1	[1], Ch. 1	<b>LECTURE:</b> Fundamental laws of Chemistry. Basic principles and main definitions. <b>LAB:</b> Properties of inorganic compounds	
2	[1], Ch.2 [2], Ch. 3	<b>LECTURE:</b> The structure of the atom. Periodic system of elements and the Periodic law. Mozli's law. The philosophical significance of the Periodic Law.	
3	[1], Ch. 4; [1-4]	<b>LECTURE:</b> Types of chemical bond: covalent bond, ionic and metal bonds. Types of chemical bond: hydrogen bond. Donor-acceptor bond. Hybridization of atomic orbitals. <b>LAB:</b> Determination of the equivalent of a substances	
4	[1], Ch. 5 [1-5]	<b>LECTURE:</b> Complex compounds. Classification of complex compounds. Nomenclature and stability of complex compounds	
5	[1], Ch. 6 [1-6]	<b>LECTURE:</b> Thermodynamics, thermodynamical systems. Heat, work, and energy. Laws of thermodynamics. The concept of enthalpy and entropy. <b>LAB:</b> Obtaining and determination of the complex compounds	
6	[1], Ch. 7 [1-5]	<b>LECTURE:</b> - Chemical kinetics and equilibrium. The rate of chemical reactions.	
7	[1], Ch. 8 [1-3]	<b>LECTURE:</b> Solutions. Classification of disperse systems. Concentration of solutions. <b>LAB:</b> Studying of the dependence of chemical reaction rate on concentration and temperature. The chemical equilibrium.	Midterm
8	[1], Ch. 8 [4-5]	<b>LECTURE:</b> Reactions in electrolyte solutions. Ionic reactions. Hydrolysis of salts.	
9	[1], Ch. 9 [1-5]	<b>LECTURE:</b> Electrochemical reactions. Oxidation-reduction (redox) reactions and their types. <b>LAB:</b> Hydrolysis of salts.	
10	[1], Ch. 10 [1-3]	<b>LECTURE:</b> Electrolysis of alloys and solutions of salts. Faraday's Laws. Practical significance of electrolysis	
11	[1], Ch. 11 [1-3]	<b>LECTURE:</b> Metals. Abundance, obtaining in the industry, and properties. Corrosion of metals. <b>LAB:</b> Redox reactions. Electrolysis of alloys and solutions of salts.	
12	[1], Ch. 12 [4-6]	<b>LECTURE:</b> Light construction metals – Be, Mg, Al – abundance, obtaining and properties, application.	
13	[2], Ch. 21	<b>LECTURE:</b> Heavy metals – Cu, Zn Cr, Fe – abundance, properties. Their application in electronic technology <b>LAB:</b> Studying of the properties of the metals	
14	[2], Ch. 21	<b>LECTURE:</b> Semiconductor chemistry – Si, Sn, Pb – abundance,	

	[1-5]	properties. Their application in electronic technology.	
15	[2], Ch. 21	<b>LECTURE:</b> Nitrogen – abundance, obtaining and properties	
<b>Recommended Sources</b>			
<b>TEXTBOOK(S)</b>			
<ol style="list-style-type: none"> <li>1. Chemistry. N.E.Cabbarova, N.I.Salmanova – 2018.</li> <li>2. General chemistry. D.Ebbing, S.Gammon - 2009.</li> <li>3. Modern general chemistry. M.M.Agaguseynova-2018</li> <li>4. Tasks and Exercises on General Chemistry. M.M.Agaguseynova,Y.G.Gahramanli-2017.</li> <li>5. Inorganic chemistry(Chemistry of Elements). M.M.Agaguseynova- 2019.</li> <li>6. Laboratory practice on General and Inorganic chemistry. M.M.Agaguseynova, N.I.Salmanova, N.E.Cabbarova-2016.</li> </ol>			
Additional information will be distributed either electronically or delivered in printed forms			
<b>Assessment</b>			
Attendance	0%	Less than 75% class attendance results in NA grade	
Presentation	10%		
Lab. works	10%		
Course work	0%		
Quiz	10%		
Midterm Exam	20%	Written Exam	
Final Exam	50%	Written Exam	
Total	100%		
<b>Assessment Criteria</b>			
Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for undergraduate studies			
<b>Course Policies</b>			
<ol style="list-style-type: none"> <li>1. Attendance of the course is mandatory.</li> <li>2. Material presented in the lecture as well as assigned readings will be included in testing.</li> <li>3. Late assignments will not be accepted unless an agreement is reached with the lecturer.</li> <li>4. Cheating and plagiarism will not be tolerated.</li> <li>5. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations</li> </ol>			
<b>ECTS allocated based on Student Workload</b>			
<b>Activities</b>	<b>Number</b>	<b>Duration (hour)</b>	<b>Total Workload (hour)</b>
<b>Course duration in class (including midterm)</b>	15	3	45
Presentation	1	10	10
Self-study	15	2,2	33
Tutorials	15	2	30
Midterm Examination	1	2	2
Preparation for midterm exam	1	12	12
Final Examination	1	3	3
Preparation for final exam	1	45	45
<b>Total Workload</b>			180
<b>Total Workload/30(h)</b>			6
<b>ECTS Credit of the Course</b>			6

