Name of science	**Chemical Safety Techniques (ECTS 4)**
Subject/module code	**KXT103**
Semester(s) in which the subject is taught .	*2nd semester*
Responsible teacher	*Sidiqova Xulkar G'ulomovna . Chemistry sciences according to philosophy Doctor (PhD), Associate Professor .*
Education language	*Uzbek*
Study to the program connection	*Optional*
Study hours (including contact hours, independent study)	**Total hours - 120.** **Auditory training hours - 60.** Lecture training hour – 20. Practical training hours – 40 **Independent study hours – 60**
ECTS	*4*
Prerequisites/ Relationship to disciplines	General chemistry, inorganic chemistry, geography, mathematics, physics, biology, organic chemistry, electrochemistry.
Objectives/learning outcomes of the subject	The purpose of the subject of chemical safety is to provide future chemistry teachers with a broad and detailed study of safety rules when working in a chemical laboratory. The program is designed for undergraduate students and serves to provide information on measures to prevent accidents in a chemical laboratory and to develop practical skills. It consists of introducing students to safety issues in the chemistry laboratory and familiarizing them with the rules of chemical safety when working with chemicals and equipment, and developing practical skills. Within the framework of the issues to be addressed in the process of mastering the subject of safety techniques in chemistry, the student should have an idea (knowledge) of the content and procedure for conducting safety techniques with students before working in a chemistry laboratory; checking the efficiency of the ventilation system in a fume hood, safety techniques when working with gaseous substances, working with flammable or combustible liquids, safety techniques when using electrical equipment, types of injuries from electric shock, familiarization with safety equipment for chemistry rooms, know how to prepare new ones and be able to use them (skill); methods for eliminating unpleasant situations in chemistry and other cabinets, and skills for providing first aid in case of injury.
Course content (topics)	**I. Main theoretical part (lecture sessions) .** Topic 1. The purpose and objectives of the subject " Safety techniques in chemistry" tasks. Topic 2. Gas in the state substances with at work applicable safety technique measures Topic 3. Safety techniques when working with alkalis, acids, and mercury . Topic 4. Flammable liquids. Storage rules and safety techniques for flammable liquids. Topic 5. Safety options for implementing some experiments in the school program. Topic 6. Safety rules when conducting certain hazardous chemical experiments. Topic 7. Safety rules that must be followed when using electrical equipment Topic 8. Fire extinguishing agents and methods of extinguishing fires in

	chemical and other rooms. Topic 9. First aid for the injured Topic 10. Technical safety when performing extracurricular activities during excursions to chemical production facilities. **II. Instructions and recommendations for organizing practical training .** - to help students systematize, consolidate, and deepen their theoretical knowledge; - teaching students to solve practical problems, and helping them acquire skills and competencies in performing calculations, graphs, and other types of tasks; - to teach how to work with books, service documents and diagrams, and to use reference and scientific literature; - to strengthen the connections and associations formed in the lecture through repeated performance of actions characteristic of the study of science (monotonous stereotypical repetitions do not lead to understanding of knowledge); - to form the ability to acquire independent knowledge, that is, to master the methods, techniques and techniques of self-study, self-development and self-control; - ensuring the development of the student's creative personality, his scientific thinking and speech; helping students grow as creative workers; – testing students' knowledge is a fairly quick way to provide feedback. **Recommended topics for practical work:** Practical exercise 1. The subject of safety in conducting chemical experiments. Forms and methods of studying safety techniques. 2- Practical training. Learning to work with personal protective equipment. Checking the efficiency of the ventilation system in a chimney cupboard 3- Practical exercise. Gaseous state substances Rules for working with. Gas-powered systems . 4- Practical exercise. Rules for classifying chemical reagents and storing them in laboratories. 5- Practical training. Safety techniques when working with flammable liquids Practical exercise 6. Safety techniques for some experiments conducted in the school chemistry program . 7- Practical exercise. The effect of electric current on the human body 8- Practical training. Familiarization with the rules for using fire extinguishers. 9- Practical training. First aid in case of injury. Practical exercise 10. Safety requirements during excursions to industrial enterprises Practical exercise 11. Conducting demonstration experiments during chemistry evenings. 12- Practical training. Introduction to safety equipment demonstrations for chemistry rooms and preparation of new ones. **III . Independent learning and independent work.** The competence of independent learning serves to promote independent self-development of students and increase the effectiveness of professional activities. Students perform independent work on their own mobile devices, in traditional forms under the guidance of a teacher, and in electronic forms under the guidance of a teacher. **Recommended topics for independent study:**

	1. Subject, forms and methods of chemical experiment safety. (4 hours) 2. Safety techniques when working with gases (4 hours) 3. Gas cylinders and their use. (4 hours) 4. Rules for classifying chemical reagents and storing them in laboratories. (4 hours) 5. Safety techniques when working with alkalis and acids. (4 hours) 6. Safety techniques when working with flammable liquids. (4 hours) 7. Safety techniques and emergency measures in experiments with fire. (4 hours) 8. Safety techniques for experiments conducted in the school chemistry program . (4 hours) 9. Properties of hydrogen sulfide. Obtaining white phosphorus and conducting experiments with it. (4 hours) 10. The effect of electric current on the human body. (4 hours) 11. Safety techniques and emergency measures in electrical experiments. (4 hours) 12. Types of fires that occur in the chemistry laboratory and methods for extinguishing them. (4 hours) 13. Rules of procedure for excursions to industrial enterprises. (4 hours) 14. Physiologically active substances and safety techniques when working with them. (4 hours) 15. Volatile substances and safety techniques when working with them. (4 hours)
Exam form	It is important to assess students' theoretical and practical knowledge when conducting current, intermediate, and final examinations in the subject. Complete mastery of theoretical and methodological concepts of the subject, the ability to correctly reflect the results of the analysis, conduct independent observations of the processes being studied, complete tasks and assignments given in the forms of current control, intermediate control, and submit a written work for final control. **Current supervision.** Current supervision is assessed with a total of 30 points based on the hours (pairs) allocated to seminar classes during the semester. The overall results of the seminar sessions will be evaluated with 30 points on a 100-point system. **Midterm exams.** Midterm exams are held once during the semester, based on the number of hours of lecture classes. Midterm exams are evaluated with 20 points on a 100-point scale. The midterm exam includes an independent learning assignment. Students who score 60% of the points allocated for the midterm and current examination are allowed to take the final examination. **Final control.** The final control is carried out in the form of a written or test. The student's mastery of the final control is evaluated with 50 points on a 100-point system, and students who score 60% of the points allocated for the final control are considered to have mastered the subject.
Educational outcomes and exam requirements	Complete mastery of theoretical and methodological concepts on the topic, the ability to correctly reflect the results of the analysis, independently reflect on the processes being studied, and complete tasks in current and intermediate forms of assessment, as well as tasks for final assessment . The student must have submitted current tests, intermediate tests, and independent learning assignments in the relevant subject within the specified time frame. A student who has not submitted current control, intermediate control, and

	independent learning assignments, as well as who has scored in the range of "0-29.9" for these assignments and control type, will not be included in the final control type. Also, a student who misses 25 percent or more of the classroom hours allocated to a subject without an excuse will be expelled from that subject, will not be allowed to take the final exam, and will be considered to have not acquired the appropriate credits in that subject. A student who has not passed the final exam or who has not passed the final exam and has scored in the range of "0-29.9" for this type of exam is considered an academic debtor.
Recommended readings	1. Iskandarov A.Yu., Saydakhmetova Sh.R., Temirov NO Chemical safety techniques. Tashkent: TDPU. -2020. 2. Kudratov O., G'aniev T. Life safety. Tashkent: Labor- 2000 3. Nishonov M., Laboratory work in chemistry at school. Tashkent: Teacher, 1996 4. Raymond General Chang. Chemistry: The Essential Concepts 5th Edition, Mc Graw-Hill Education; England 2013. 5. VYGankin&Y.V.Gankin. General Chemistry. Institute of the ethical chemistry, Boston, USA, 2012 . 6. Yu.T. Toshpulatov, NGRakhmatullaev, A.Yu. Iskandarov. Solving problems in inorganic chemistry. Tashkent-2003. 7. Parpiev NA, Inorganic from chemistry laboratory trainings . Tashkent: Publisher . -2019. 8. Umarov B. Organic chemistry / Tashkent. - Economics - Finance. - 2007.