Name of science	Green Chemistry (ECTS 6)
Subject/module code	**YKT06**
Science taught semester (s).	*1st 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*
Training hours (this including communication hours , independent education)	**Total hours - 180.** **Audience Training hours - 60.** Lecture training hour – 30 Practical training hour – 30 **Independent education hour – 120**
ECTS	*6*
Prerequisites / Subjects with connection	General chemistry , inorganic chemistry , mathematics , physics , biology , computer science
Purpose of science / education results	Fannie from teaching target - students green chemistry appearance to be reason, humanity with dependency , ecological of problems current to the day come globalization . “ Green ” chemistry his/her own excellent level activity with to art comparison , that is, those substances not only simple road with , maybe unusual roads with to take help to give , in which working of release any stage human health and surroundings environment to the cleanliness damage It is not possible to deliver . outside every how of the relationship done increase for less energy spending , and his/her from methods use working release expenses reduce and harmful waste products loss stages done increase demand not to do attention takes . The mission of science is to teach students to “Green chemistry" circle practical in training mastered all topics according to knowledge to form , to them circle conclusions take out to take , and them in practice application skills from development consists of . Production release thriftiness , ecological positive in terms of such as tasks own inside takes .
Course content (topics)	**I. Main theoretical part (lecture sessions) .** Topic 1. Introduction. The science and industry of green chemistry in Uzbekistan Development. Limited availability of hydrocarbon raw materials and substances. Topic 2. “Green Chemistry” – New Philosophical Perspectives for Chemists complex. Topic 3. Principles of "Green Chemistry". Topic 4. Renewable raw materials and energies. Topic 5. CO2 greenhouse gas. Anthropogenic impact on the atmosphere. Topic 6. The role of biotechnology and microbiology in green chemistry. Topic 7: Food storage packages. Topic 8. Green nanotechnology and green-friendly technologies. Topic 9. Reducing the generation of waste and harmful products and ways to prevent. Topic 10. Organic, inorganic, analytical, industrial chemistry and green chemistry related to chemical engineering. Anastas reported on green chemistry opinion. **II. Instructions and recommendations for organizing practical training .**

	- to students theoretical in character knowledge systematization , consolidation and to deepen help to give ; - to students practical issues to solve teaching , calculations , graphics and other kind of assignments to perform skill and qualifications to occupy assistance ; - book , service documents and diagrams with to work , reference and scientific from literature to use to teach ; - science to study typical was actions repetitive to perform through in the lecture formed connections and associations reinforcement (monotonous) stereotypical repetitions knowledge to understand take does not come); - independent knowledge to take ability to form , that is oneself learning , self-study develop and oneself control to do methods , methods and methods mastery ; - development provide creative activity student's personality , his scientific thinking and speech ; students creative hardworking as to grow help to give ; – students knowledge try – enough fast idea to inform tool . **Recommended topics for practical work:** Practical exercise 1. Green chemistry science subject , relevance and necessity . Green chemistry science people in life place . exercise 2. " Green " chemistry ” – chemists for new philosophical confusion exercise 3. “ Green” " chemistry " principles Practical exercise 4.CO_2 greenhouse gas and from it use paths . exercise 5. “ Green ” chemistry in practice . Practical training 6. Biotechnology and microbiology green in chemistry Biodiesel and hydrogen fuel . Practical exercise 7. Food products to keep packages . “ Chemical " hours " of safe option . Practical exercise 8. Green nanotechnology and his/her methods Practical exercise 9.CO_2 of reproduction problems . Greenhouse effect. Atmosphere . Coal , oil , gas. Practical exercise 10. Waste and harmful products harvest to be reduce and harvest to be prevent to take paths . exercise 11. “ Starch - glucose - alcohol” scheme according to fuel to take biotechnology . Practical exercise 12. Green chemistry organic , inorganic , analytical , industrial chemistry and chemical engineering with dependency . **IV. 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. Green nanotechnology and green friendly technologies 2. " High " "critical " reactors . 3. From the “ green ” solvent use paths . 4. Waste and harmful products again after work according to them harvest to be reduce , or harvest to be prevent to take roads 5. Synthesis so plan working let it be , in this in use of the material dear all to the product Let it turn . 6. Opportunity at the level so synthetic methods working exit necessary , then in use and harvest happening of the substance impact - people and to the environment

	harmless Let it be . 7. Receiving of the material harmful the impact reduced without his/her harvest to be fruit save to stay 8. Production in the release in use assistant from products and every kind solvent from reagents less use or in general not to use . 9. Energy spending reduction,chemical processes mainly room and atmosphere temperature, and under pressure transfer 10. Economic and technician comfortable to be provide for harvest happening products again renewable to be condition 11. Synthesis in the process every kind functional groups protection , every kind the deputies application and temporary physicist chemical in change processes possibility as much as possible reduce , because would be additional reagents demand does and waste amount increases . 12. Always catalytic of processes the most productive to choose movement to do 13. Obtained chemical products so so that from it using since after remaining excess amount in nature so mold maybe not harmless to products Let it fall apart . 14. Chemical in processes harvest happening all of products time unit inside harmful to the product not to rotate control Let it be done . 15. Chemical in processes in use substances so so that , his/her unexpectedly face giver weekly explosion , fire flowing to leave , like features to a minimum come on . 16. " Green" chemistry ” – chemists for new philosophical views complex . 17. Green chemistry modern chemistry development in concept role . 18. Green chemistry functions . 19. Carbonate anhydride chemistry industry for the most good potential raw materials 20. Paul Anastas and John Warner's 12 principles based on " Green "chemistry" to practice used scheme 21. The Sun energy and fuel from elements use and energy transmission new methods create 22. “ Starch - glucose -alcohol” scheme according to fuel to take biotechnology . 23. Green chemistry in the field great achievements . 24. Green chemistry organic , inorganic , analytical , industrial chemistry and chemical engineering with dependency . 25. Alcohol from grain working release technology . 26. Greenhouse effect . Atmosphere anthropogenic impact . 27. Carbonate anhydride to catch and uncontrolled to the atmosphere not to spread to provide . 28. Carbonate anhydride chemical to tie . 29. Green chemistry stable development important factor . 30. In the future ecological safe products working take out can new industry processes working exit
Exam shape	By science current control , interval control and final controls in transfer students theoretical and practical knowledge assessment important . **1.Current control** students lesson training during shown activity , practical skills and software supplies use ability to evaluate aimed at will be . Student by course topics mastery , also learning material constructive accordingly comment and analysis to do , to the module related skills development , practical skills (qualification) and designated number in terms of) and competencies

	occupation , professional practical skills to apply directed problematic situations solution to be in the team work , presentations preparation and etc. preparation through student's daily in the lessons activity is evaluated.Current control forms : in the lessons activity , learning materials preparation , topic within sources with work , education from technologies use , in the community work , presentations preparation , testing. **2.Intermediate control .** Semester during lecture training training from the hour come came out 2 times without is held . Interval control 100 points with 20 points in the system is evaluated . Interval and current control for separated 60% of the score collected to students final control to submit permission is given . **3. Final control .** Final control of the course in the end done increased and students general knowledge and skills to evaluate focused . Final control type semester in the end in the relevant subject student's theoretical knowledge and practical skills mastery level determination for the purpose will be held. Final control 5 questions on the ticket there is is , every one to the question given answers with a maximum of 10 points is evaluated .
Education results and for exams to be placed requirements	To fully master theoretical and methodological concepts on the topic, correctly reflect the results of the analysis, be able to independently think about the processes being studied, and complete assignments in current and intermediate forms of assessment, as well as assignments for final assessment. to do . 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.
Recommendation done literature	1. Parpiyev NA, Rakhimov HR, Muftakhov AG Inorganic chemistry (theoretical - Tashkent, "O'zbekiston", 2000. 2. Parpiyev NA, Muftakhov AG, Rakhimov XR Inorganic chemistry. - Tashkent: "U'zbekiston", 2003. 3. Neoganicheskaya chemistry. V 3 tomax. Pod. Ed. Tretyakova Yu.D. Moscow: "Academy" 2007. 4. J. Clark, D. Macquarrie, Handbook of green chemistry and technology "Blackwell Publishing" 2012 u. 5. Shamsiddinova GD, Chemical ecology. Textbook., Science and technology., 2010., https://lib.jdpu.uz/library_manual/view/71 6. ENLutfullaev, ZNNormurodov, ATBerdiev Inorganic Chemistry laboratory exercises. Tashkent, "O'zbekiston" 2006. 166 p. 7. R.A. Lidin, V.A. Molochko, L.L. Andreeva. Chemical properties inorganicheskix veshchestv. Moscow "Chemistry". 2000 g. 8. NI Fayzullayev, NS Tursunova, UM Norkulov “General Chemistry” Samarkand - 2019. 9. NS Tursunova, NI Fayzullayev “General Chemistry” Part II. Samarkand -2019.

	10. Khodzhitdinova M. Water chemistry and microbiology. Textbook. New edition. 2010. https://lib.jdpu.uz/library_manual/view/101