

MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS
OF THE REPUBLIC OF UZBEKISTAN
URGANCH STATE UNIVERSITY



GENERAL CHEMICAL TECHNOLOGY
CURRICULUM OF SCIENCE

Field of knowledge:

700,000 – Engineering, processing and construction industries

Field of study:

710,000 – Engineering work

Course of Study:

60710100 – Chemical technology (Inorganic substances, Silicate materials, Organic substances)

Urganch - 2024

Subject/module code UKTB361	Academic year 2024-2025	Semester 6	ECTS - Credits 7	
Subject/module type Mandatory	Language of education English		Class hours per week 6	
1.	The name of the subject	Audience training (hours)	Independent study (hours)	Total download (hour)
	General chemical technology	90	120	210
2.	I. The content of science It is to teach students the main branches of chemical technology, to carry out chemical technological processes in optimal conditions, to produce chemical products according to world standards, to create waste-free technologies, to teach the analysis of technological systems for the production of inorganic products, and to create the skills of their practical application. II. The main theoretical part (lecture sessions) III. The subject includes the following topics: Topic 1. Theoretical foundations of chemical technology: content, subject and method of the science "General chemical technology". The main directions of technology development. Topic 2. Chemical equilibrium. The principle of Le-Chatel. The law of mass effect and its practical application. Phase rule for heterogeneous systems. Rate and rate-enhancing measures of homogeneous and heterogeneous reactions. Topic 3. Importance of catalysis in technology. Topic 4. Chemical reactors. Chemical technological system. Chemical reactors. Ideal compression and mixing reactors. Their characteristic equation, model. Thermal mode of reactors. Isothermal, adiabatic and polythermal reactors. Topic 5. Industrial reactors. Chemical technological system. Topic 6. Production technologies of inorganic substances. Sulfuric acid production technology. Topic 7. Bonded nitrogen compounds. Topic 8. Technology of mineral fertilizers. Topic 9. Types of silicate materials. Technology of porcelain and earthenware. Binding materials. Topic 10. Rare metals. Topic 11. Production technologies of organic substances. Basic concepts. The main sources of organic matter. Topic 12. Oil. Natural gas. Coal. Slans fuel. Processing them. Topic 13. Basic organic synthesis. The main manifestations. Fischer-Tropsch reaction.			

18. www.wikipedia.ru 19. www.chemport.uz	
7.	Developed and approved by Urganch State University .
8.	Responsible for the subject/module: Jumaniyozov J. - Trainee teacher of "Chemical technologies" department of UrSU Jumaniyozov A. - Trainee teacher of "Chemical technologies" department of UrSU
9.	Reviewers: Associate. Aitova Sh. Associate. Saparbaeva NK

This educational program has been approved by the minutes of the University Academic and Methodological Council's meeting dated August 29 2024, under protocol number 1.

This educational program has been approved by the minutes of the meeting of the Department of Chemical Technologies dated August 22, 2024, under protocol number 1.

Head of the Department of Academic Affairs and Registrar:  G. Matlatipov
Dean of the Faculty:  Sh. Kurambayev
Head of the department:  Sh. Aitova
Organizers:  J. Jumaniyozov
 A. Jumaniyozov

Topic 14. Polyethylene, polypropylene and polyvinyl chloride production technology.
Topic 15. Processing of polymers.

III. Instructions and recommendations for practical training

Practical The following topics are recommended for training:

Topic 1: Calculation of the consumption coefficient.

Topic 2: Material input-output accounting for irreversible chemical technological processes.

Topic 3: Preparation of material input-output accounting for reversible chemical technological processes.

Topic 4: Calculation of the equilibrium level in chemical technological processes. Heat calculations in chemical technological processes.

Topic 5: Calculation of chemical reactors. Calculation of contact equilibrium levels.

Topic 6: Calculation of rate constants and process rates.

Topic 7: Calculation of catalyst volumes and reactor dimensions.

Topic 8: Material input-output accounting for ammonia production.

Topic 9: Material input-output accounting for nitric acid production.

Topic 10: Material balance in the production of phosphoric acid by extraction.

Topic 11: Material input-output accounting for nitrogenous fertilizer production.

Topic 12: Material input-output accounting for Portland cement production.

Topic 13: Calculation of oil fractions. Analysis of hydrocarbons in gas compositions.

Topic 14: Solving problems related to polymerization reactions.

Topic 15: Solving problems related to polycondensation reactions.

IV. Instructions and recommendations for laboratory exercises

The following topics are recommended for laboratory sessions:

Topic 1: Absorption of hydrogen chloride and production of hydrochloric acid.

Topic 2: Esterification of acetic acid.

Topic 3: Production of phosphoric acid from phosphate raw materials using extraction methods.

Topic 4: Production of nitrogenous fertilizers and determination of nitrogen content in fertilizers using the formaldehyde method.

Topic 5: Production of binding materials based on gypsum.

Topic 6: Study of the corrosion resistance of metals and non-metals.

Topic 7: Study of the properties of oil and its products.

Topic 8: Production of polymers based on polymerization reactions.

V. Independent education and independent work

Recommended topics for independent study:

	- Optimal conditions in technological processes. - Directions of chemical engineering development. - Importance of automation in processes. - The significance of mineral fertilizers in agriculture. - Mechanization of processes, complex mechanization. - Production systems. - Chemical balance in processes. - Le Chatelier's principle and its application in technological processes. - Equilibrium constant. - Phase diagrams and their importance in technology. - Solubility (of gases) dependence on pressure. - Raoult's law. - Rate of heterogeneous reactions. - The contact process for sulfuric acid production. - Reactors used in sulfuric acid production. - Physical-chemical principles of single superphosphate production. - Technological scheme of urea production. - Theoretical foundations of the ammonia synthesis process. - Technology for producing dilute nitric acid. - Hypotheses about glass structure. - Physical-chemical processes occurring in the production of lime from limestone. - Processes occurring during lime slaking. - Physical-chemical processes in the setting of Portland cement. - Products obtained from petroleum. - Monomer synthesis from natural gas. - Monomers obtained from acetylene. - Physical-chemical processes in polymer production based on acrylonitrile. - Theoretical foundations of fiber production based on PAN. - Theoretical foundations of cellulose processing. - Physical-chemical processes in the fractional separation of natural gas. - Here are the translations for the provided topics: - Theoretical foundations of the polyester production process. - Theoretical foundations of the production process of polycondensation polymers.
3.	VI. Results of science education (competencies to be formed) As a result of mastering the subject, the student:

	- collecting and using information necessary for process optimization and solving production problems
4.	VII. Educational technologies and methods : lectures; individual assignments; work in groups.
5.	VIII. Requirements for obtaining loans : Full mastery of theoretical and methodological concepts related to science, ability to solve small practical problems, independently create methods, structures and perform tasks and assignments given in current, interim control forms, submit written work for final control.
6.	IX. Main literature 1. By Rudolf wagner, PH.D. and William Crookes, F.R.S. CHEMICAL TECHNOLOGY, Handbook 768p, 2. Т.А.Отақұзиев, К.А. Ахмеров, С.М.Туробжонов. Умумий кимёвий технология. Дарелик Т.: Ўзбекистон. 2013. 3. Мухленов И.Н., Авербух А.Я, и др. Общая химическая технология: Учебник для химико-техн спец. вузов. В 2-х т. - М.: ООО 4. «Издательский дом Алянс», 2009 - 256 p. 5. Леонтева .А.И., Вранкин К.В. Общая химическая технология: Учеб. Пособие. Тамбов : Изд-во Тамб.гос. техн. Ун-та, 2004. 108 p. Additional literature: 6. Mirzaqulov X.Ch., Shamsiddinov I.T., To'raev Z. Murakkab o'g'irlar ishlab chiqarish nazariyasi va texnologik hisoblari. Study guide. - T., "Tafakkur" 7. Ibragimov G.I., Erkaev A.U., Yakubov R.Ya., Turbjonov S.M. Kaliy xlorid texnologiyasi. Study guide. - T., TKTI, 2010. -208 b. 8. Kattayev N. Kimyoviy texnologiya. Study guide, -T., Yangiylul polygraph servise, 2008, 432 p 9. Mirziyoyev III.M Qonun ustuvorligi va inson manfaatlarini ta'minlash-yurt taraqqiyoti va xalq farovonligining garovi 48 p, T. "Uzbekistan", 2017 y 10. Mirziyoyev Sh.M. Erkin va farovon demokratik O'zbekiston davlatini birgalikda barpo etamiz. 56 p. T. "Uzbekistan", 2016 11. Mirziyoyev Sh.M .Buyuk kelajagimizni mard va olijanob xalqimiz bilan birga quramiz.- T.: Uzbekistan, 2017. --488 p. Internet sites 12. www.gov.uz - the government portal of the Republic of Uzbekistan . 13. www.lex.uz - National database of information on legal documents of the Republic of Uzbekistan 14. www.texhology.ru 15. www.google.ru 16. www.ziyounet.uz 17. www.google.uz