



**Joint stock company
"Academy of Logistics and Transport"**

EDUCATIONAL PROGRAM

Name: 6B07100 - Chemical Engineering

Level of training: Bachelor's degree

Code and classification of training areas: 6B071 – Engineering and Engineering

Code and group of educational programs: B-060 – Chemical Engineering and Processes

Date of registration in the Registry: 03.11.2022

Registration number: 6B07100056

Almaty, 2022

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1. INFORMATION ABOUT THE REVIEW, APPROVAL AND APPROVAL OF THE PROGRAM, DEVELOPERS, EXPERTS

DEVELOPED BY

Leading specialist of the Department
of Science, D.C.S.


(signature)

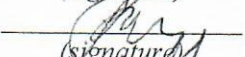
Meldeshov A.A.

Assistant Professor, C. T. S.


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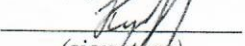
Tsygankov S.G.

Associate Professor, PhD


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Abdreshov Sh.A.

Senior lecturer


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Kurmashev B.B.

EXPERTS

General manager
Central Asian Institute of
Environmental Research LLP


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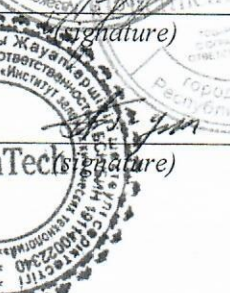
Tovasarov A.D.

Sales Director
Chemical Solutions LLP


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Abdrakhmanova G.A.

General manager
Institute of Green Chemical
Technologies LLP


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Kadirbekov K.A.

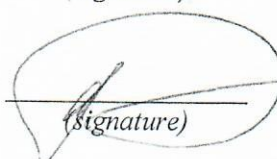
REVIEWED AND RECOMMENDED

Meeting of the department
"M VaLS"
Protocol № 1
from August 27, 2022


(signature)

Yesengaliev M.N.

Meeting ACE-EMB institute of
"Transport Engineering"
Protocol № 1
from August 31, 2022


(signature)

Chigambayev T.O.

Meeting of the ALT EMC
Protocol №2
from October 20, 2022


(signature)

Zharmagambetova M.S.

APPROVED by the decision of the Academic Council, of September 29, 2021 (Protocol №1).

INTRODUCED for the first time.

2. REGULATORY REFERENCES

The educational program has been developed on the basis of the following regulatory legal acts and professional standards:

1. The Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III stages (with amendments and additions as of January 08, 2021).
2. The National Qualifications Framework approved by the Protocol of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.
3. The sectoral qualifications framework of the field of "Education", approved by the Minutes of the meeting of the sectoral Commission of the Ministry of Education and Science of the Republic of Kazakhstan on social partnership and regulation of social and labor relations in the field of education and science dated November 27, 2019 No. 3.
4. The State mandatory standard of Higher Education (Annex 7 to the Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No. 604 with amendments and additions as of May 05, 2020).
5. Qualification directory of positions of managers, specialists and other employees, approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30, 2020 No. 553.
6. Rules for organizing the educational process on credit technology of training, approved by the Order of the Minister of the Ministry of Education and Science of the Republic of Kazakhstan No. 152 dated 20.04.2011. (with additions and amendments dated October 12, 2018 No. 563).
7. Classifier of training areas with higher and postgraduate education, approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 13, 2018 No. 569 (with amendments and additions as of June 05, 2020).
8. The algorithm of inclusion and exclusion of educational programs in the Register of educational programs of higher and postgraduate education, approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated December 4, 2018 No. 665 (with additions and amendments as of December 22, 2020).
9. RI-ALT-33 "Regulations on the procedure for developing an educational program of higher and postgraduate education".
10. New Zealand Qualifications System. <https://www.nzqa.govt.nz/assets/Studying-in-NZ/New-Zealand-Qualification-Framework/requirements-nzqf.pdf>
11. Report on the review of international experience of methodological principles and approaches in the development of professional standards in the OECD and APEC countries. <http://kazlogistics.kz/upload/iblock/ca2/ca26d0e67b5e447fec98ab1b2017e7f0.pdf>
12. The current system of qualifications of the European Higher Education Area Bologna. Ministry of Science, Technology and Innovation February 2005. <https://socio.msu.ru/documents/umo/bologne/A%20Framework%20for%20Qualifications%20of%20the%20European%20Higher%20Educat.pdf>
13. Graduate attributes and Professional competencies, International Engineering Alliance (Version 3, June 21, 2013). <http://www.ieagreements.org/IEA-Grad-Attr-Prof-Competencies.pdf>;
14. The FEANI EUR ING Register Manual, approved by the General Assembly on October 4, 2013. <http://www.feani.org/site/index.php?id=261>

3. PASSPORT OF THE EDUCATIONAL PROGRAM

| № | Field name | Note |
|----|--|---|
| 1 | Registration number | 6B07100056 |
| 2 | Code and classification of the field of education | |
| 3 | Code and classification of training areas | 6B071 – Engineering and Engineering |
| 4 | Code and group of the educational program (EP) | B-060 – Chemical engineering and processes |
| 5 | Name of the educational program (EP) | 6B07100 - Chemical Engineering |
| 6 | View (EP) | New |
| 7 | The purpose of the educational program (EP) | Training of qualified bachelor's degree specialists in the field of chemical engineering, able to set goals and formulate tasks related to the implementation of professional functions in the production of organic and inorganic substances, possessing theoretical knowledge, practical skills, adapted to modern labor market conditions, motivated to continuous professional education, as well as safe operation of technologies in the production and transportation of petroleum products using advanced chemical methods. |
| 8 | Level according to the International Standard Classification of Education (ISCE) | 6 |
| 9 | Level according to the National Qualification Framework (NQF) | 6 |
| 10 | Level according to the Industry Qualifications Framework (IQF) | 6 |
| 11 | Distinctive features of the educational program (EP) | No |
| | HEI-partner, joint educational program (JEP) | |
| | HEI-partner, two-degree educational program (TDEP) | |
| 12 | Form of training | Full-time, full-time with the use of DET |
| 13 | Language of instruction | Kazakh, Russian |
| 14 | Volume of loans | 241 |
| 15 | Academic degree awarded | Bachelor of Engineering and Technology in the educational program 6B07100 - Chemical Engineering |
| 16 | Availability of an appendix to the license for the direction of training | |
| 17 | Availability of educational program accreditation (EP) | |
| | Name of the accreditation body | |
| | Validity period of accreditation | |

4. THE GRADUATE'S COMPETENCE MODEL

Objectives of the educational program:

1. Formation of a person capable of self-improvement and professional growth with diverse humanitarian and natural science knowledge and interests.
2. Formation of the ability to critically rethink the accumulated experience, change, if necessary, the profile of their professional activities, awareness of the social significance of their future profession, having a high motivation to perform professional activities.
3. Formation of the ability to find a compromise between various requirements (cost, quality, safety and deadlines) in long-term and short-term planning and to make optimal decisions in the production and transportation of petroleum products, using advanced achievements in the field of chemical engineering;
4. Formation of the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it.
5. Assistance in the formation of graduates' readiness for the rational use of chemical technologies in the production and transportation of petroleum products.
6. Systematization and application of research methods of chemical and chemical-technological processes used for control, analysis of raw materials and target petroleum products, in order to improve the technological stages.
7. Modification of existing technological processes to improve the efficiency and quality of the target oil product in the conditions of the set professional task.
8. Engineering calculations and modeling of chemical and technological processes and equipment for the production of petroleum products.

Learning outcomes:

- LO1 - Be able to express your thoughts competently and defend your own opinion when discussing professional issues in an international environment in Kazakh, Russian and English
- LO2 - Apply the ability to continuous professional development and professional improvement, solve problems in professional activity using knowledge of natural sciences, mathematical analysis and modeling using innovative computer technologies. To lead a healthy lifestyle necessary to ensure full-fledged social and professional activities through methods and means of physical culture.
- LO3 - To explain the natural science picture of the world through the unity of the basic concepts of socio-humanitarian and natural science knowledge, as well as the laws of physics, chemistry, to apply the acquired knowledge and skills in various types of social and professional activities
- LO 4 - To choose and apply methods of prevention and protection from hazards at work, in case of accidents and catastrophes, and to use methods of ensuring fire, radiation, and electrical safety at the enterprise, using advanced engineering knowledge in electrical engineering, and methods of increasing the fire resistance of metal structures made of various alloys and methods of their fastening.
- LO5 - Is able to improve professional and personal qualities, develop leadership skills, possess methods of analyzing the competitiveness of the organization, considering market trends. Be able to recognize changes in the business environment and determine the strategic direction of development using resource-saving and waste-free technologies.
- LO6 - Is able to name and identify the causes of environmental pollution using knowledge in the field of environmental legislation, fuel chemistry, methods of operation and use of transport power plants.

LO7 - Possess methods of ecological and economic analysis for making environmentally appropriate, engineering and management decisions, be able to generalize and analyze information for setting goals and choosing rational ways to achieve it.

LO8 – Apply safe methods of operation of gas and oil pipelines. Possess methods of research of oil and gas systems, as well as methods of operation and design of oil and gas pipelines and oil and gas storage facilities.

LO9 - Demonstrate knowledge and understanding of classical results of general and inorganic chemistry, organic chemistry, analytical chemistry, colloidal chemistry, metal corrosion, general chemical technology, surfactant technology, nanotechnology, theory and principles of chemical engineering, possess methods of analyzing environmental problems.

LO10 - To know the basic methods of analysis, quality control of raw materials and products of chemical production, petrochemical synthesis, oil and gas, petrochemistry, technology of processing and purification of natural and associated gases and wastewater.

LO11 – To apply knowledge and understanding in professional activities for modeling and designing chemical processes, to know the processes and devices of chemical technology, to apply them in the field of chemical engineering.

LO12 – Know the basics of alternative energy sources, renewable energy sources and energy conservation. Be able to analyze methods and methods of using renewable energy to improve energy conservation and energy efficiency.

Objects of professional activity

Any enterprises and organizations, including the transport industry, that influence natural, man-made, social, information systems and their components, factors determining the safety of life and environmental protection, engaged in the development, implementation and operation of technological systems, design and research institutes, design bureaus, firms of various forms of ownership, enterprises for the production of petroleum products, for the processing of oil, gas and coal and polymers, mineral raw materials, solid and liquid fuels, for the preparation of, extraction and transportation of petroleum products and their rational use.

Types of professional activity

- design and engineering;
- service and operational;
- organizational and technological;
- production and management;
- expert, supervisory and inspection-audit;
- scientific research;
- educational (pedagogical).

Functions of professional activity

1) Carrying out preventive measures to ensure the stability of the enterprise in emergency situations of peacetime and wartime, the organization of civil defense units at the enterprise and interaction with emergency services;

2) Control of the state of the environment, participation in environmental expertise and audit to assess the environmental impact of technosphere regions and projects for the construction of new technical facilities, supervision of compliance with environmental legislation;

3) Readiness to participate in the organization of environmental control and monitoring systems, the development of ecological and logistics schemes, environmental management at the

enterprise, environmental management at the district level, urban areas;

4) Willingness to carry out scientific research as an executor of new methods of environmental control and monitoring, control of pollution sources, new chemical technologies for the production and transportation of petroleum products, energy and resource saving technologies;

5) Development of technical projects for environmental control and monitoring, geoinformation systems, energy- and resource-saving technologies, introduction of alternative fuels and non-traditional renewable and energy-saving energy sources, projects for the use of secondary resources, closed production cycles, environmentally optimized production-consumption cycles, as part of a team and under the leadership;

6) Organization of evaluation of the composition and properties of the feedstock in order to be able to develop new technological processes that ensure high quality;

7) Analysis of ways to improve and modernize technological lines, equipment in order to conduct highly efficient technological processes for the production and transportation of petroleum products.

List of specialist positions

Process engineer, chemical technologist, technologist, master technologist, petrochemical engineer, engineer of research institutes, operator of technological installations, occupational health and safety engineer, environmental engineer, specialist in waste management, rationing and state environmental expertise, civil defense specialist and emergency situations, researchers and specialists developers of regulatory and technical documentation in the field of occupational safety and environmental protection, teacher of secondary technical educational institutions.

Professional certificates obtained at the end of training: no.

Requirements for the previous level of education: Secondary, post-secondary, vocational secondary.

In the course of training, students undergo various types of professional practice:

- educational;
- production;
- pre-graduation.

Educational practice

The purpose of the educational and introductory practice is to expand and consolidate theoretical knowledge, to master theoretical knowledge in the chosen specialty, to train students to solve managerial, research and other tasks, including in production conditions, to prepare students for a deeper study of special disciplines.

Production practice

During the internship period, the student receives certain practical knowledge, skills and abilities in the field of chemical engineering.

The main objectives of industrial practice are: consolidation of theoretical knowledge and practical skills in the chosen educational program in production conditions, acquisition of organizational work experience, obtaining a working specialty, formation of practical skills and competencies in the process of mastering the bachelor's program. Industrial practice for students is an important component of the educational process, allowing them to navigate the labor market

and find themselves in their future profession.

Pre-graduate practice

The content of the pre-graduate practice is determined by the topic of the thesis (project). During the pre-graduate practice, the student collects factual material about the production (professional) activities of the enterprise (organization) and uses it in the development of the graduation project (work).

The purpose of pre-graduate practice for bachelors is to ensure the relationship between the theoretical knowledge gained during the assimilation of the chosen educational program and practical activities. The objectives of the pre-graduate practice are to consolidate and deepen the theoretical knowledge gained by students in the learning process, to collect information for writing a final qualifying work, to study best practices at the enterprise, as well as to gain experience in independent work.

The final certification is carried out in the form of writing and defending a thesis (project) or preparing and passing a comprehensive exam. The purpose of the final certification is to evaluate the learning outcomes and the acquired competencies achieved upon completion of the study of the educational program of higher education.

The thesis (project) aims to identify and evaluate the analytical and research abilities of the graduate and is a generalization of the results of the student's independent study of an urgent problem in the field of his chosen specialty. The comprehensive exam program reflects integrated knowledge and key competencies that meet the requirements of the labor market in accordance with the educational program of higher education.

5. MATRIX OF CORRELATION OF LEARNING OUTCOMES ACCORDING TO THE EDUCATIONAL PROGRAM WITH ACADEMIC DISCIPLINES/MODULES

| № | Name of the discipline | Number of credits | Matrix of correlation of learning outcomes according to the educational program with academic disciplines | | | | | | | | | | | |
|----------------------------------|---|-------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| | | | LO1 | LO2 | LO3 | LO4 | LO5 | LO6 | LO7 | LO8 | LO9 | LO10 | LO11 | LO12 |
| 1. | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1. | History of Kazakhstan | 5 | | | + | | | | | | | | | |
| 2. | Philosophy | 5 | | | + | | | | | | | | | |
| 3. | Foreign language | 10 | + | | | | | | | | | | | |
| 4. | Kazakh (Russian) language | 10 | + | | | | | | | | | | | |
| 5. | Information and communication technologies (in English. Language) | 5 | | + | | | | | | | | | | |
| Socio-political knowledge module | | | | | | | | | | | | | | |
| 6. | Sociology | 3 | | | + | | | | | | | | | |
| 7. | Political Science | 3 | | | + | | | | | | | | | |
| 8. | Cultural studies | 1 | | | + | | | | | | | | | |
| 9. | Psychology | 1 | | | + | | | | | | | | | |
| 10. | Physical Culture | 8 | + | | | | | | | | | | | |
| 11. | Fundamentals of transport ecology | 5 | | | | | | + | | | | | | |
| 12. | Fundamentals of Entrepreneurship and Leadership | 5 | | | | | + | | + | | | | | |
| 13. | Fundamentals of law and anti-corruption culture | 5 | + | | | + | | | | | | | | |
| 14. | Religious studies | 5 | | | + | | | | | | | | | |
| 15. | Introduction to the theory of gender | 5 | | | + | | | | | | | | | |
| 16. | Fundamentals of modernization of public consciousness | 5 | | | + | | | | | | | | | |
| 17. | Foreign Language Workshop | 5 | + | | | | | | | | | | | |
| 18. | Innovative IT technologies | 5 | | | + | | | | | | | | | |
| 19. | Math 1 | 5 | | + | | | | | | | | | | |
| 20. | Math 2 | 4 | | + | | | | | | | | | | |
| 21. | Physics 1 | 5 | | | + | | | | | | | | | |
| 22. | Physics 2 | 4 | | | + | | | | | | | | | |
| 23. | Ecology and life safety | 4 | | | | + | + | | | | | | | |
| 24. | Labor protection | 4 | | | | + | | + | + | | | | | |
| 25. | Professional foreign language | 3 | + | | | | | | | | | | | |
| 26. | Theoretical mechanics | 5 | | | | + | | | | | | | | |
| 27. | Electrical engineering and the | 5 | | | | + | | | | | | | | |

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|-----|---|---|--|---|---|---|---|---|---|---|---|---|---|---|
| | basics of electronics | | | | | | | | | | | | | |
| 28. | Materials Science and TCM | 5 | | | | + | | + | | | | | | |
| 29. | General and inorganic chemistry | 5 | | + | | | | | | | + | | | |
| 30. | General chemical technology | 5 | | + | | | | | | | | | + | |
| 31. | Educational practice | 3 | | | | | | | | | | | | |
| 32. | Design basics | 4 | | + | | | | | | | | | | |
| 33. | Design of transport facilities | 4 | | + | | | | | | | | | | |
| 34. | Fundamentals of Economics and Entrepreneurship | 3 | | | | | + | | + | | | | | |
| 35. | Fundamentals of economic theory | 3 | | | | | + | | | | | | | + |
| 36. | Fundamentals of management | 4 | | | | | + | | | | | | | + |
| 37. | Economy of transport | 4 | | | | + | + | | + | | | | | |
| 38. | Fundamentals of petrochemical synthesis | 5 | | | | | | | | | | + | | |
| 39. | Chemistry of oil and gas | 5 | | | | | | | | | | + | | |
| 40. | Petrochemicals | 6 | | | | | | | | | | + | | |
| 41. | Theoretical foundations of organic chemistry | 6 | | | + | | | | | | + | | | |
| 42. | Gas chemical processes in oil refining | 4 | | | + | | | | | | + | | | |
| 43. | Chemistry and technology of heterocyclic compounds | 4 | | | + | | | | | | + | | | |
| 44. | Analytical Chemistry | 5 | | | + | | | | | | | | | |
| 45. | Colloidal chemistry | 5 | | | + | | | | | | | + | | |
| 46. | Technology of surface active substances | 4 | | | | | | | | | + | | | |
| 47. | Basic processes and devices of chemical technology | 4 | | | | | | | | | | | + | |
| 48. | Corrosion processes and methods of their prevention | 4 | | | | | | | | | + | | | |
| 49. | Control systems of chemical and technological processes | 4 | | | | | | + | | | | | + | |
| 50. | Greening of fuels and lubricants | 3 | | | | | | + | | | | | | |
| 51. | Chemmotology | 3 | | | | | | + | | | | | | |
| 52. | Environmental problems of chemical materials production | 5 | | | | | | | | | + | | | |
| 53. | Technology of petrochemical production | 5 | | | | | | | | | + | | | |
| 54. | Rules of technical operation of pipeline transport | 4 | | | | | | | | + | | | | |
| 55. | Rules of operation of oil storage facilities | 4 | | | | | | | | + | | | | |
| 56. | Renewable energy sources and energy conservation | 5 | | | | | | | | | | | | + |
| 57. | Alternative energy sources | 5 | | | | | | | | | | | | + |
| 58. | Pipeline transportation of oil and gas | 5 | | | | | | | | + | | | | |
| 59. | Nanotechnology of carbon compounds | 5 | | | | | | | | | + | | | |
| 60. | Toxicity of transport power | 5 | | | | | | + | | | | | | |

| | | | | | | | | | | | | | | |
|-----|---|----|--|--|--|---|--|--|---|---|---|---|--|--|
| | plants | | | | | | | | | | | | | |
| 61. | Fundamentals of natural and wastewater treatment technology | 5 | | | | | | | | | + | | | |
| 62. | Technology of deep processing of oil and gas | 6 | | | | | | | | | | + | | |
| 63. | Fire safety | 5 | | | | + | | | | | | | | |
| 64. | Technology of purification and processing of natural and associated petroleum gases | 5 | | | | | | | | | | + | | |
| 65. | Electrical safety and lightning protection | 6 | | | | + | | | | | | | | |
| 66. | Protection of the air basin from pollution | 5 | | | | | | | + | | | | | |
| 67. | Environmental documentation | 6 | | | | | | | + | + | | | | |
| 68. | Production practice | 4 | | | | | | | | | | | | |
| 69. | Pre - graduation | 3 | | | | | | | | | | | | |
| 70. | FINAL CERTIFICATION: Writing and defending a thesis project (work) | 12 | | | | | | | | | | | | |

6. STRUCTURE OF THE BACHELOR'S DEGREE PROGRAM

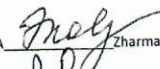
| № | Name of cycles of disciplines | Total labor intensity | |
|-----------|--|-----------------------|---------------------|
| | | in academic hours | in academic credits |
| 1 | Cycle of general education disciplines (GED) | 1680 | 56 |
| 1) | Required component | 1530 | 51 |
| | Foreign language | 300 | 10 |
| | Kazakh (Russian) language | 300 | 10 |
| | History of Kazakhstan | 150 | 5 |
| | Information and communication technologies (in English) | 150 | 5 |
| | Module of socio-political knowledge (sociology, political science, cultural studies, psychology) | 240 | 8 |
| | Physical Culture | 240 | 8 |
| | Philosophy | 150 | 5 |
| 2) | Component of choice | 150 | 5 |
| 2 | Cycle of basic disciplines (BD) | 3390 | 113 |
| 1) | Component of choice, in that xbckt: | 1710 | 57 |
| 1.1) | Educational practice | | |
| 2) | Component of choice | 1680 | 56 |
| 3 | Cycle of profile disciplines (PD) | 1800 | 60 |
| 1) | Component of choice, in that xbckt: | 1800 | 60 |
| 1.1) | Production practice | | |
| 1.2) | Pre-graduate practice | | |
| 4 | Final certification | 360 | 12 |
| 1) | Writing and defending a thesis, graduation project, or preparing and passing a comprehensive exam | 360 | 12 |
| | Total | 7230 | 241 |

Degree: Bachelor of Engineering and Technology

| № | Discipline code | Name of cycles and disciplines | Total labor intensity | | Form of control, semester | | The amount of study load, contact hours | | | | | | Distribution by semester | | | | | | | | | | Securing the chair | |
|-------------------------|--|---|-----------------------|---------------------|---------------------------|---------|---|-----------|-----------|------------|------|------|--------------------------|--------|----------|--------|----------|--------|----------|----|--------|--------|--------------------|-------|
| | | | in academic hours | In academic credits | Exam | IP (KR) | Total hours | Classroom | | | IWO | | 1th year | | 2th year | | 3th year | | 4th year | | | | | |
| | | | | | | | | lectures | practical | laboratory | IWTT | IWO | 1 sem. | 2 sem. | 3 sem. | 4 sem. | 5 sem. | 6 sem. | 7 sem. | | 8 sem. | 9 sem. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| 1 | CYCLE OF GENERAL EDUCATION DISCIPLINES (OOD) | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1. | | Required component | 1530 | 51 | | | 1530 | 120 | 388 | 15 | 148 | 860 | 16 | 18 | 12 | 5 | 0 | 0 | 0 | 0 | 0 | | | |
| 1.1.1. | 22-0-B-OK-IK | History of Kazakhstan | 150 | 5 | 3 | | 150 | 30 | 15 | | 8 | 97 | | | 5 | | | | | | | SHDPE | | |
| 1.1.2. | 22-0-B-OK-Fil | Philosophy | 150 | 5 | 4 | | 150 | 30 | 15 | | 8 | 97 | | | | 5 | | | | | | SHDPE | | |
| 1.1.3. | 22-0-B-OK-IYa | Foreign language | 300 | 10 | 1,2 | | 300 | | 90 | | 16 | 194 | 5 | 5 | | | | | | | | LT | | |
| 1.1.4. | 22-0-B-OK-K(R)Ya | Kazakh (Russian) language | 300 | 10 | 1,2 | | 300 | | 90 | | 16 | 194 | 5 | 5 | | | | | | | | LT | | |
| 1.1.5. | 22-0-B-OK-ITT | Information and communication technologies (in English. Language) | 150 | 5 | 3 | | 150 | 30 | | 15 | 8 | 97 | | | 5 | | | | | | | ICC | | |
| 1.1.6. | 22-0-B-OK-MSPZ | Socio-political knowledge module | 240 | 8 | 1,2 | | 240 | | | | | | 4 | | | | | | | | | SHDPE | | |
| | | Sociology | | | | | | 7 | 15 | | 8 | 30 | | | | | | | | | | | | |
| | | Cultural studies | | | | | | 8 | 15 | | 8 | 15 | | | | | | | | | | | | |
| | | Political Science | | | | | | 7 | 15 | | 8 | 30 | | | | | | | | | | | | |
| | | Psychology | | | | | | 8 | 15 | | 8 | 15 | | | 4 | | | | | | | | | |
| 1.1.7. | 22-0-B-OK-FK | Physical Culture | 240 | 8 | 1,2,3,4 | | 240 | 89 | | | 60 | 91 | 2 | 4 | 2 | | | | | | | SHDPE | | |
| 1.2. | | Компонент по выбору | 150 | 5 | | | 150 | 30 | 15 | 0 | 30 | 60 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | | | |
| 1.2.1. | 22-0-B-KV-OTE | Fundamentals of transport ecology | 150 | 5 | 4 | | 150 | 30 | 15 | | 30 | 60 | 16 | 18 | 12 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | MVLS | |
| | 22-0-B-KV-OPL | Fundamentals of Entrepreneurship and Leadership | | | | | | | | | | | | | | | | | | | | | | LT |
| | 22-0-B-KV-OAPT | Fundamentals of law and anti-corruption culture | | | | | | | | | | | | | | | | | | | | | | SHDPE |
| | 22-0-KV-Rel | Religious studies | | | | | | | | | | | | | | | | | | | | | | SHDPE |
| | 22-0-KV-VTG | Introduction to the theory of gender | | | | | | | | | | | | | | | | | | | | | | SHDPE |
| | 22-0-KV-OMOS | Fundamentals of modernization of public consciousness | | | | | | | | | | | | | | | | | | | | | | SHDPE |
| | 22-0-KV-PIYA | Foreign Language Workshop | | | | | | | | | | | | | | | | | | | | | | LT |
| | 22-0-KV-IITT | Innovative IT technologies | | | | | | | | | | | | | | | | | | | | | | ICC |
| TOTAL FOR THE ODD CYCLE | | | 1680 | 56 | | | 1680 | 150 | 403 | 15 | 178 | 920 | 16 | 18 | 12 | 10 | 0 | 0 | 0 | 0 | 0 | | | |
| 2 | CYCLE OF BASIC DISCIPLINES (BD) | | | | | | | | | | | | | | | | | | | | | | | |
| 2.1 | | University component | 1710 | 57 | | | 1710 | 203 | 210 | 105 | 104 | 1013 | 14 | 13 | 13 | 8 | 5 | 4 | 0 | 0 | 0 | | | |
| 2.1.1. | 22-0-B-VK-Mat1 | Math 1 | 150 | 5 | 1 | | 150 | 15 | 30 | | 8 | 97 | 5 | | | | | | | | | E | | |
| 2.1.2. | 22-0-B-VK-Mat2 | Math 2 | 120 | 4 | 2 | | 120 | 30 | 15 | | 8 | 67 | | 4 | | | | | | | | E | | |
| 2.1.3. | 22-0-B-VK-Fiz1 | Physics 1 | 150 | 4 | 1 | | 150 | 15 | 15 | 15 | 8 | 97 | 5 | | | | | | | | | E | | |
| 2.1.4. | 22-0-B-VK-Fiz2 | Physics 2 | 120 | 4 | 2 | | 120 | 15 | 15 | 15 | 8 | 67 | | 4 | | | | | | | | E | | |
| 2.1.5. | 22-0-B-VK-EBG | Ecology and life safety | 120 | 4 | 1 | | 120 | 30 | 15 | | 8 | 67 | 4 | | | | | | | | | MVLS | | |
| 2.1.6. | 22-0-B-VK-LP | Labor protection | 120 | 4 | 6 | | 120 | 15 | 15 | 15 | 8 | 67 | | | | | | 4 | | | | MVLS | | |
| 2.1.7. | 22-0-B-VK-PIYa | Professional foreign language | 90 | 3 | 3 | | 90 | | 30 | | 8 | 52 | | | 3 | | | | | | | LT | | |
| 2.1.8. | 22-0-B-VK-TM | Theoretical mechanics | 150 | 5 | 3 | | 150 | 15 | 30 | | 8 | 97 | | | 5 | | | | | | | CE | | |
| 2.1.9. | 22-0-B-VK-EOE | Electrical engineering and the basics of electronics | 150 | 5 | 3 | | 150 | 15 | 15 | 15 | 8 | 97 | | | 5 | | | | | | | E | | |
| 2.1.10. | 22-0-B-VK-MTKM | Materials Science and TCM | 150 | 5 | 2 | | 150 | 15 | 15 | 15 | 8 | 97 | | 5 | | | | | | | | CE | | |
| 2.1.11. | 22-B-VK-GIC | General and inorganic chemistry | 150 | 5 | 4 | | 150 | 30 | | 15 | 8 | 97 | | | | 5 | | | | | | GE | | |
| 2.1.12. | 22-0-B-VK(KV)-GCT | General chemical technology | 150 | 5 | 5 | | 150 | 15 | 15 | 15 | 8 | 97 | | | | | 5 | | | | | GE | | |
| 2.1.13. | 22-0-B-KV-Upr | Educational practice | 90 | 3 | 4 | | 90 | | | | | | | | | 3 | | | | | | GE | | |
| 2.2 | | Component of choice | 1680 | 56 | | | 1560 | 255 | 225 | 60 | 96 | 954 | 0 | 0 | 5 | 12 | 15 | 12 | 8 | 4 | 0 | | | |
| 2.2.1. | 22-0-B-KV-OP | Design basics | 120 | 4 | 4 | | 120 | 15 | | 30 | 8 | 67 | | | 4 | | | | | | | CE | | |
| | 22-0-B-KV-PTO | Design of transport facilities | | | | | | | | | | | | | | | | | | | | CE | | |
| 2.2.2. | 22-0-B-KV-OEP | Fundamentals of Economics and Entrepreneurship | 90 | 3 | 4 | | 90 | 15 | 15 | | 8 | 52 | | | 3 | | | | | | | LTM | | |
| | 22-0-B-KV-OET | Fundamentals of economic theory | | | | | | | | | | | | | | | | | | | | LTM | | |
| 2.2.3. | 22-0-B-VK(KV)-OM | Fundamentals of management | 120 | 4 | 5 | | 120 | 30 | 15 | | 8 | 67 | | | | | 4 | | | | | LTM | | |
| | 22-0-B-VK(KV)-ET | Economy of transport | | | | | | | | | | | | | | | | | | | | LTM | | |
| 2.2.4. | 22-26/33-B-KV-FPS | Fundamentals of petrochemical synthesis | 150 | 5 | 4 | | 150 | 30 | 15 | | 8 | 97 | | | 5 | | | | | | | GE | | |
| | 22-26/33-B-KV-COG | Chemistry of oil and gas | | | | | | | | | | | | | | | | | | | | GE | | |
| 2.2.5. | 22-26/33-B-KV-PC | Petrochemicals | 180 | 6 | 5 | | 180 | 30 | 30 | | 8 | 112 | | | | 6 | | | | | | GE | | |
| | 22-26/33-B-KV-TFOC | Theoretical foundations of organic chemistry | | | | | | | | | | | | | | | | | | | | GE | | |
| 2.2.6. | 22-26/33-B-KV-GCPR | Gas chemical processes in oil refining | 120 | 4 | 8 | | 120 | 30 | 15 | | 8 | 67 | | | | | | | | | | GE | | |
| | 22-26/33-B-KV-CTHC | Chemistry and technology of heterocyclic compounds | | | | | | | | | | | | | | | | | | | | GE | | |
| 2.2.7. | 22-26/33-B-KV-AC | Analytical Chemistry | 150 | 5 | 4 | | 150 | 15 | 15 | 15 | 8 | 97 | | 5 | | | | | | | | GE | | |
| | 22-26/33-B-KV-CC | Colloidal chemistry | | | | | | | | | | | | | | | | | | | | GE | | |

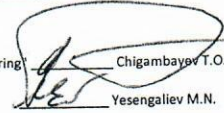
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|--------------------------------------|-----------------------------------|---|------|-----|---|----|------|-----|------|-----|-----|------|----|----|----|----|----|----|----|----|----|-------|
| 2.2.8. | 22-26/33-B-KV-TSAS | Technology of surface active substances | 120 | 4 | 6 | | 120 | 30 | 15 | | 8 | 67 | | | | | | 4 | | | | GE |
| | 22-33-B-KV-BPDCT | Basic processes and devices of chemical technology | | | | | | | | | | | | | | | | | | | | GE |
| 2.2.9. | 22-26/33-B-KV-CPMTP | Corrosion processes and methods of their prevention | 120 | 4 | 6 | | 120 | 30 | 15 | | 8 | 67 | | | | | | 4 | | | | GE |
| | 22-26/33-B-KV-CSTP | Control systems of chemical and technological processes | | | | | | | | | | | | | | | | | | | | GE |
| 2.2.10. | 22-26/33-B-KV-ETSM | Greening of fuels and lubricants | 90 | 3 | 7 | | 90 | 15 | 15 | | 8 | 52 | | | | | | | 3 | | | GE |
| | 22-26/33-B-KV-Himm | Chemmotology | | | | | | | | | | | | | | | | | | | | GE |
| 2.2.11. | 22-26/33-B-KV-EPC | Environmental problems of chemical materials production | 150 | 5 | 7 | | 150 | 30 | 15 | | 8 | 112 | | | | | | | 5 | | | GE |
| | 22-26/33-B-KV-TPP | Technology of petrochemical production | | | | | | | | | | | | | | | | | | | | GE |
| 2.2.12. | 22-26/33-B-KV-PTETT | Rules of technical operation of pipeline transport | 120 | 4 | 6 | | 120 | 30 | 15 | | 8 | 67 | | | | | | 4 | | | | CE |
| | 22-26/33-B-KV-PEN | Rules of operation of oil storage facilities | | | | | | | | | | | | | | | | | | | | CE |
| 2.2.13. | 22-26/33-B-KV-RESES | Renewable energy sources and energy conservation | 150 | 5 | 5 | | 150 | 15 | 15 | 15 | 8 | 97 | | | | | | 5 | | | | E |
| | 22-26/33-B-KV-AES | Alternative energy sources | | | | | | | | | | | | | | | | | | | | E |
| TOTAL BY DB CYCLE | | | 3390 | 113 | | | 3270 | 458 | 435 | 165 | 200 | 1967 | 14 | 13 | 18 | 20 | 20 | 16 | 8 | 4 | 0 | |
| 3 | CYCLE OF PROFILE DISCIPLINES (PD) | | | | | | | | | | | | | | | | | | | | | |
| | | University component | 1800 | 60 | | | 1590 | 300 | 180 | 15 | 80 | 1015 | 0 | 0 | 0 | 0 | 10 | 14 | 22 | 11 | 3 | |
| 3.1.1. | 22-26/33-B-VK-TTNG | Pipeline transportation of oil and gas | 150 | 5 | 6 | | 150 | 30 | 15 | | 8 | 97 | | | | | | 5 | | | | CE |
| 3.1.2. | 22-26/33-B-KV-NCC | Nanotechnology of carbon compounds | 150 | 5 | 5 | | 150 | 30 | 15 | | 8 | 97 | | | | | | 5 | | | | GE |
| 3.1.3. | 22-26/33-B-KV-TTEU | Toxicity of transport power plants | 150 | 5 | 5 | | 150 | 30 | 15 | | 8 | 97 | | | | | | 5 | | | | MVLS |
| 3.1.4. | 22-26/33-B-KV-OTOPSV | Fundamentals of natural and wastewater treatment technology | 150 | 5 | 7 | кр | 150 | 30 | 15 | | 8 | 97 | | | | | | | 5 | | | MVLS |
| 3.1.5. | 22-26/33-B-KV-TPOG | Technology of deep processing of oil and gas | 180 | 6 | 7 | | 180 | 30 | 30 | | 8 | 112 | | | | | | | 6 | | | GE |
| 3.1.6. | 22-26/33-B-VK-PB | Fire safety | 150 | 5 | 6 | | 150 | 30 | 15 | | 8 | 97 | | | | | | | 5 | | | MVLS |
| 3.1.7. | 22-26/33-B-VK-TPPPG | Technology of purification and processing of natural and associated petroleum gases | 150 | 5 | 7 | | 150 | 30 | 15 | | 8 | 97 | | | | | | | 5 | | | GE |
| 3.1.8. | 22-0-B-VK-EBMZ | Electrical safety and lightning protection | 180 | 6 | 7 | | 180 | 30 | 15 | 15 | 8 | 112 | | | | | | | 6 | | | MVLS |
| 3.1.9. | 22-26/33-B-VK-OVBZ | Protection of the air basin from pollution | 150 | 5 | 8 | кр | 150 | 30 | 15 | | 8 | 97 | | | | | | | | 5 | | MVLS |
| 3.1.10. | 22-33-B-VK-ED | Environmental documentation | 180 | 6 | 8 | | 180 | 30 | 30 | | 8 | 112 | | | | | | | | 6 | | MVLS |
| 3.1.11. | 22-0-B-VK-PPr | Production practice | 120 | 4 | | | | | | | | | | | | | | | 4 | | | GE |
| 3.1.12. | 22-0-B-VK-PredPr | Pre-graduation | 90 | 3 | | | | | | | | | | | | | | | | | 3 | GE |
| TOTAL BY DB CYCLE | | | 1800 | 60 | | | 1590 | 300 | 180 | 15 | 80 | 1015 | 0 | 0 | 0 | 0 | 10 | 14 | 22 | 11 | 3 | |
| Total for theoretical training: | | | 6870 | 229 | 0 | 0 | 6540 | 878 | 1018 | 195 | 458 | 3902 | 30 | 31 | 30 | 30 | 30 | 30 | 30 | 15 | 3 | |
| 5 | 22-0-B-VK-IA | FINAL CERTIFICATION: Writing and defending a thesis project (work) | 360 | 12 | | | | | | | | | | | | | | | | | 12 | GE |
| TOTAL FOR THE ENTIRE PERIOD OF STUDY | | | 7230 | 241 | | | | | | | | | 30 | 31 | 30 | 30 | 30 | 30 | 30 | 15 | 15 | |
| Additional types of training: | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Additional types of training | Volunteering | 30 | 1 | 1 | | 30 | | 10 | | 8 | 12 | | | | | | | | | | SHDPE |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |

Agreed:

A. Vice-Rector for AEA  Zharmagambetova M.S.

Director of the DAA  Alimseitova Zh.K.

Developed by:

Director of the Institute "Transport Engineering"  Chigambayev T.O.

Head of the department "MVLS"  Yesengaliev M.N.

8. CATALOG OF DISCIPLINES OF THE UNIVERSITY COMPONENT

EDUCATIONAL PROGRAM - 6B07100 - Chemical Engineering

Education level: Bachelor's degree

Duration of study: 4 years

Year of admission: 2023

| Module | Cycle | Component | Name of the discipline | Total labor intensity | | Term | Learning outcomes | Brief description of the discipline | Prerequisites | Post-requirements |
|---|-------|-----------|------------------------|-----------------------|---------------------|------|-------------------|---|---------------------------------------|--|
| | | | | in academic hours | in academic credits | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Module 2. Cycle of basic disciplines | BD | UC | Math 1 | 150 | 5 | 1 | LO 2 | Gives concepts to the learner of a known stock of information (definitions, formulas, theorems, connections between them and methods of solving problems) for the development of logical thinking and achieving the necessary mathematical culture, for studying other disciplines and subsequent work in the specialty. In the course "Mathematics-1" the following sections are studied: linear algebra, analytical geometry, differential and integral calculus of a function of one variable | Basic school knowledge in mathematics | Math 2, Physics 2 |
| | BD | UC | Math 2 | 120 | 4 | 2 | LO 2 | The discipline is aimed at mastering the fundamental concepts and laws of modern mathematics, techniques and methods for solving specific problems with functions of several variables, differential equations and series theory. The following sections are studied in the discipline: differential calculus of functions of several numbers, multiple integrals, series, differential equations. When studying "Mathematics 2", students develop mathematical thinking and culture, which are necessary for application in future professional activities | Math 1 | Probability theory and mathematical statistics |
| | BD | UC | Physics 1 | 150 | 5 | 1 | LO 3 | The discipline is the basic discipline of the university component. The subject of physics and its relation to other sciences. Mechanics, kinematics, dynamics. Classical, quantum, relativistic mechanics. Elements of kinematics. The main task of dynamics. Equations of motion. Limits of applicability of classical mechanics. The laws of conservation of momentum, angular momentum, energy. The principle of relativity in mechanics. The Lorentz transformation. Statistical physics and thermodynamics. Classical statistics. Electricity and magnetism.. | Basic school knowledge in physics | Math 2, Physics 2 |
| | BD | UC | Physics 2 | 120 | 4 | 2 | LO 3 | When studying the course "Physics 2", the main attention will be paid to the properties of waves and vibrations, the laws of optics, the basic principles of | Math 1, Physics 1 | Electrical safety and lightning protection , |

| | | | | | | | | | | |
|---|----|----|--|-----|---|---|------------------|---|---|--|
| | | | | | | | | Quantum mechanics and atomic physics. The course reflects the current state of modern physics and combines macroscopic and microscopic approaches. | | electrical engineering and the basics of electronics |
| | BD | UC | Ecology and life safety | 120 | 4 | 1 | LO 4, LO 5 | The discipline studies the basic environmental concepts, environmental problems and approaches to their solution; sources and types of environmental pollution by transport enterprises; principles of rationing the quality of atmospheric air and water. Natural and man-made emergencies, their causes, methods of prevention and protection. Carrying out rescue and other urgent work, rules of behavior of people in emergency situations of natural and man-made origin. | Basic school knowledge in chemistry, biology | Air basin protection labor protection, environmental documentation |
| | BD | UC | Labor protection | 120 | 4 | 6 | LO 4, LO 6, LO 7 | The discipline studies the main dangerous and harmful production factors affecting workers of automobile and railway transport, during the operation and repair of rolling stock, advanced methods and technical solutions to reduce occupational injuries, improve working conditions and workplace safety, methods of organizing and managing occupational safety, fire and electrical safety, the main activities in the organization jobs. | Basic school knowledge in chemistry, biology, ecology and life safety | Fundamentals of petrochemical synthesis, diploma design |
| Module 2. Cycle of basic disciplines | BD | UC | Professional foreign language | 90 | 3 | 3 | LO 1 | Improving the level of foreign language proficiency of students in the relevant field of training; mastering the necessary professional terminology in a foreign language; mastering the necessary and sufficient level of communicative competence for students to solve social and communicative tasks in various fields of professional activity, which will further improve professional self-education | Foreign language | Foreign Language Workshop |
| | BD | UC | Theoretical mechanics | 150 | 5 | 3 | LO 4 | It consists of the following modules: statics, kinematics, dynamics of a material point and dynamics of a mechanical system. Theoretical mechanics is the scientific basis of many areas of modern technology, its laws and methods allow us to study and explain a number of important phenomena in the world around us and contribute to the further growth and development of natural science as a whole. The objectives of the course are to study the basic concepts and laws of mechanics, master the methods and be able to apply the knowledge gained to solving the simplest problems of mechanics and profile disciplines | Math 1,2 | Control system of chemical and technological processes |
| | BD | UC | Electrical engineering and the basics of electronics | 150 | 5 | 3 | LO 4 | When studying this discipline, the student must acquire knowledge, skills and practical skills on electrical circuits of direct, alternating and three-phase currents, on the device, principle of operation and purpose of a transformer and electrical machines, on measurements of electrical quantities, on the characteristics and parameters of | Physics 1,2 | Basic processes and devices of chemical technology |

| | | | | | | | | | | |
|---|----|----|--|-----|---|---|-------------|--|--|---|
| | | | | | | | | semiconductor devices, on the application and general rules of operation of semiconductor devices and circuits. | | |
| | BD | UC | Materials Science and TCM | 150 | 5 | 2 | LO 4, LO 6 | The discipline is the basic discipline of the university component. It consists of the following modules: Structure and properties of metals and alloys, engineering and tool materials, technology of structural materials. | Math 1,2 | Rules of technical operation of pipeline transport, pipeline transport of oil and gas |
| | BD | UC | General and inorganic chemistry | 150 | 5 | 4 | LO 2, LO 9 | The discipline is the basic discipline of the university component. The discipline studies the basic concepts and laws of chemistry, the structure of the atom and the periodic law, chemical bonds, the energy of chemical reactions, the conditions of spontaneous processes, chemical and phase equilibrium, chemical kinetics, catalysts, solutions, redox reactions and electrochemical processes. | Basic school knowledge in chemistry, biology | Analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry |
| | BD | UC | General chemical technology | 150 | 5 | 5 | LO 2, LO 11 | To form the ability to choose the methods of organizing the technological process, building chemical-technological schemes, taking into account the safe conduct and waste-free process. The course forms the foundations of technological and environmental thinking. It is aimed at studying: laws of chemical technology, fundamentals of theory, calculation, supply of chemical reactors, methods of chemical and technological processes, use of raw materials and energy, industrial ecology, production of the most important organic substances. | General and inorganic chemistry, theoretical foundations of organic chemistry, chemistry of oil and gas | Technology of petrochemical production, technology of deep processing of oil and gas |
| | | | Educational practice | 90 | 3 | 4 | | The organization of educational practice is aimed at providing bachelors with familiarization with the main directions, objects, areas of professional activity and profiles of training and consolidation of theoretical material. | | |
| Module 3. Cycle of profile disciplines | PD | UC | Pipeline transportation of oil and gas | 150 | 5 | 6 | LO 8 | The discipline studies the design and features of laying linear pipes and structures, bases for pipelines, the principles of pipe connections, different types of construction of oil and gas pipelines, the method of hydraulic calculation of the main pipeline, methods of technological calculation of the oil product pipeline with sequential pumping of oil and gas above the ground, pressure characteristics and oil pipelines and pumping stations with different pressures, methods of pumping of high-viscosity petroleum products, features of temperature regimes of main pipelines. | Theoretical mechanics, materials science and technology of structural materials, general chemical technology | Greening of fuels and lubricants, technology of petrochemical industries |
| | PD | UC | Production practice | 120 | 4 | | | The main objectives of industrial practice are: consolidation of theoretical knowledge and practical skills in the chosen educational program in production conditions, acquisition of organizational work experience, obtaining a working specialty, formation of practical skills and competencies in the | | |

| | | | | | | | | | | |
|----|----|---|-----|---|---|------------|--|--|---|--|
| | | | | | | | | process of mastering the bachelor's program. | | |
| PD | UC | Fire safety | 150 | 5 | 6 | LO 4 | The discipline is the main discipline of the university component The discipline outlines the types, conditions of occurrence and causes of fires at transport facilities and rolling stock; fire safety requirements for electrical equipment, engineering systems and the general plan of the enterprise; discusses issues related to the flammability and fire resistance of building materials and structures; as well as measures to prevent fires, means and methods of extinguishing them, actions of personnel in case of fire. | Ecology and life safety, physics, chemistry, mathematics, greening of fuels and lubricants | Environmental problems of production of chemical materials, chemmotology, technology of deep processing of oil and gas | |
| PD | UC | Fundamentals of natural and wastewater treatment technology | 150 | 5 | 7 | LO 9 | The discipline studies the types and sources of water pollution, natural sources of water supply, water intake structures, requirements for water quality in reservoirs and waters of cultural and domestic and drinking water supply, technological processes, structures, biological physicochemical and mechanical methods of purification. | Physics, Mathematics, General and Inorganic Chemistry | Protection of the air basin from pollution, technology of purification and processing of natural and associated petroleum gases | |
| PD | UC | Nanotechnology of carbon compounds | 150 | 5 | 5 | LO 9 | The discipline studies the types and sources of water pollution, natural sources of water supply, water intake structures, requirements for water quality in reservoirs and waters of cultural and domestic and drinking water supply, technological processes, structures, biological physicochemical and mechanical methods of purification. | General and inorganic chemistry, theoretical foundations of organic chemistry | Gas chemical processes in oil refining, chemistry and technology of heterocyclic compounds | |
| PD | UC | Toxicity of transport power plants | 150 | 5 | 5 | LO 6 | The discipline examines the fundamentals of the theory of internal combustion engines, their classification, the principle of operation, the formation and characteristics of harmful substances released as a result of the operation of transport power plants. The influence of the design features of the internal combustion engine on the amount of emissions of harmful substances. Regulation of emissions of harmful substances from cars and the main ways to reduce the toxicity of exhaust gases. | Ecology and life safety | Corrosion processes and methods of their prevention, greening of fuels and lubricants, protection of the air basin from pollution | |
| PD | UC | Technology of deep processing of oil and gas | 180 | 6 | 7 | LO 10 | The discipline is aimed at studying the processes of deep processing of oil residues: thermal, thermocatalytic, hydrogenation. As a result of studying the discipline, students have an idea of the state and trends in the development of the global fuel and energy industry, the importance of natural carbohydrate raw materials in energy, chemical, in the production of carbon materials and other industries of the Republic of Kazakhstan, about rational directions and technologies for processing natural energy resources taking into account engineering, economic and environmental requirements of the time. | Chemistry of oil and gas, petrochemistry, theoretical foundations of organic chemistry, analytical chemistry | Gas chemical processes in oil refining, protection of the air basin from pollution, diploma design | |
| PD | UC | Environmental documentation | 180 | 6 | 8 | LO 7, LO 8 | The discipline studies the main regulations and documents for the preparation of environmental | Ecology and life safety, | Diploma design | |

| | | | | | | | | | | |
|--|----|----|---|-----|---|---|-------|--|---|--|
| | | | | | | | | reporting. The sequence and stages of the environmental Impact Assessment procedure, which includes the Draft standards for the release of pollutants into the atmosphere, discharges of pollutants into water bodies, the placement of solid household waste. The requirements for the content, structure, and design of the draft standards of PDV and PDV for the enterprise" The procedure for the development of EIA. | environmental problems of chemical materials production | |
| | PD | UC | | | | | | The purpose of pre-graduate practice for bachelors is to ensure the relationship between the theoretical knowledge gained during the assimilation of the chosen educational program and practical activities. The objectives of the pre-graduate practice are to consolidate and deepen the theoretical knowledge gained by students in the learning process, to collect information for writing a final qualifying work, to study best practices at the enterprise, as well as to gain experience in independent research work, mastering various methods of scientific work. | | |
| | | | Pre - graduation | 90 | 3 | 8 | | | | |
| | PD | UC | Protection of the air basin from pollution | 150 | 5 | 8 | LO 7 | The discipline examines the properties and patterns of the spread of pollutants in the atmosphere. Sources of man-made emissions. The design and principles of operation of dust and gas cleaning equipment at industrial enterprises. Methods for determining the maximum permissible emissions of pollutants into the atmosphere for an industrial enterprise, the dispersion of harmful substances in the atmosphere, as well as methods for determining the necessary parameters for the preparation of a draft MPI. | General and inorganic chemistry, oil and gas chemistry, physics, mathematics, toxicity of transport power plants, environmental problems of chemical materials production | Diploma design |
| | PD | UC | Electrical safety and lightning protection | 180 | 6 | 7 | LO 4 | The discipline outlines the causes of electrotraumatism, factors affecting the degree of electric shock, the organization of safe operation of electrical installations, prevention of electrical injuries, protection from fires and explosions in electrical installations, medical and organizational measures for first aid in electric shocks, anti-lightning protection devices, protection from static electricity. | General and inorganic chemistry, physics, mathematics, ecology and life safety, labor protection | Protection of the air basin from pollution, gas chemical processes in oil refining |
| | PD | UC | Technology of purification and processing of natural and associated petroleum gases | 150 | 5 | 7 | LO 10 | The discipline outlines the causes of electrotraumatism, factors affecting the degree of electric shock, the organization of safe operation of electrical installations, prevention of electrical injuries, protection from fires and explosions in electrical installations, medical and organizational measures for first aid in electric shocks, anti-lightning protection devices, protection from static electricity. | General and inorganic chemistry, ecology and life safety | Air basin protection, environmental documentation, diploma design |

9. CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE

EDUCATIONAL PROGRAM 6B07100 - Chemical Engineering

Education level: Bachelor's degree

Duration of study: 4 years

| Module | Cycle | Component | Name of the discipline | Total labor intensity | | Term | Learning outcomes | Brief description of the discipline | Prerequisites | Post-requirements |
|--|-------|-----------|--------------------------------------|-----------------------|-------------------|------|-------------------|---|--|--|
| | | | | in academic hours | in academic hours | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Module 1. General education competencies | GED | CC | Religious studies | 150 | 5 | 4 | LO 3 | The discipline is a general education discipline of the elective component. It consists of the following modules: 1. theoretical foundations of religious studies, 2. world religions, 3. the current religious situation in the world, 4. religion as a socio-cultural phenomenon. The discipline provides students with a conceptual and categorical apparatus in the field of religious studies, key terms and methods of religious analysis, features of religious teachings, patterns and basic forms of world and non-traditional religions. | Basic school knowledge of history, geography | History of Kazakhstan, philosophy, political science, psychology |
| | GED | CC | Introduction to the theory of gender | 150 | 5 | 4 | LO 3 | The discipline is a general education discipline of the component of choice. It consists of the following modules: the essence of the concept of "gender", gender studies, the problem of gender in the history of mankind, gender stereotypes and prejudices, international cooperation in the struggle for the recognition and enforcement of women's rights, gender in theory and practice of development. | Basic school knowledge of history, geography | History of Kazakhstan, philosophy, political science, psychology |

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|--|-----|----|---|-----|---|---|------------|---|--|---|
| | GED | CC | Fundamentals of modernization of public consciousness | 150 | 5 | 4 | LO 3 | The discipline is a general education discipline of the elective component. It consists of the following modules: the mission of spiritual modernization, solving the tasks of modernization of public consciousness, consideration of state programs aimed at modernization of public consciousness, socio-ethical values of the Kazakh society.. | Sociology, cultural studies, religious studies | Pedagogy |
| | GED | CC | Foreign Language Workshop | 150 | 5 | 4 | LO 1 | To master the discipline, students use the knowledge, skills, methods of activity and attitudes formed during the study of the disciplines "Introduction to the theory of intercultural communication", "Literature and culture of the countries of the first foreign language", "Practical course of the second foreign language", "Practical course of the first foreign language", "Russian language and culture of speech", "Situational grammar of the second foreign language", "Home reading", "Communicative grammar of the first foreign language", "Linguistics | Foreign language, professional language, foreign | |
| | GED | CC | Innovative IT technologies | 150 | 5 | 4 | LO 3 | To master the discipline, students use the knowledge, skills, methods of activity and attitudes formed during the study of the disciplines "Introduction to the theory of intercultural communication", "Literature and culture of the countries of the first foreign language", "Practical course of the second foreign language", "Practical course of the first foreign language", "Russian language and culture of speech", "Situational grammar of the second foreign language", "Home reading", "Communicative grammar of the first foreign language", "Linguistics | Information and communication technologies, mathematics, physics | Protection of the air basin from pollution, control systems of chemical and technological processes |
| | GED | CC | Fundamentals of law and anti-corruption culture | 150 | 5 | 4 | LO 1, LO 4 | Problems of formation of anti-corruption culture both in historical and modern contexts. Systematically, reveals the universal essence, the nature of origin, the reason for the persistence of corruption, also analyzes the socio-economic, legal, cultural, moral and ethical aspects of combating corruption in the Republic of Kazakhstan. | Political science, pedagogy, psychology | Philosophy, sociology, economic theory, fundamentals of law |
| | GED | CC | Fundamentals of transport ecology | | | | | The discipline examines stationary and mobile sources of environmental | Ecology and life safety | Foreign language workshop, rules of technical operation |

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|---|-----|----|---|-----|---|---|------------|--|----------|-----------------------|
| | | | | 150 | 5 | 4 | LO 6 | pollution by road and rail transport enterprises, the main harmful effects on the atmosphere, water and soil, methods of reducing the harmful effects of transport on the environment and methods of cleaning waste gases and wastewater from transport enterprises, methods of noise reduction. Economic foundations and management of environmental protection at transport enterprises | | of pipeline transport |
| | GED | CC | Fundamentals of Entrepreneurship and Leadership | 150 | 5 | 4 | LO 5, LO 7 | The discipline studies: scientific and legislative foundations of the organization and conduct of entrepreneurial activity in the Republic of Kazakhstan, features, problems and prospects of its development in the Republic of Kazakhstan, introduction to entrepreneurship, introduction to marketing, investments and their role in the formation and development of the company, business planning, rules and techniques of doing business, innovation and innovation process, features risk in conditions of market uncertainty | | |
| Module 2. Cycle of basic disciplines | BD | CC | Design basics | 120 | 4 | 4 | LO 2 | Mastering by students of practical skills in the use of computer methods of designing technological machines and equipment, acquisition of knowledge necessary for the study of subsequent disciplines. Must be able to conduct patent research in order to ensure the patent purity of new design solutions and their patentability with the determination of indicators of the technical level of the designed products and develop working design and technical documentation, execute completed design and construction works with verification of compliance of the developed projects and technical documentation with standards, specifications and other regulatory documents. | Math 1,2 | Diploma design |

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|--|----|----|--|-----|---|---|-------------|--|--|--|
| | BD | CC | Fundamentals of Economics and Entrepreneurship | 90 | 3 | 4 | LO 5, LO 7 | The discipline is the basic discipline of the component of choice. It consists of the following modules: the concept of economics, economic relations, the model of equilibrium and functioning of the market, competition, macroeconomic equilibrium, the essence, content and conditions of entrepreneurship development, organizational and legal forms, business planning, business secrecy.. | Math 1,2, professional foreign language | Fundamentals of management, economics of transport |
| | BD | CC | Fundamentals of economic theory | 90 | 3 | 4 | LO 5, LO 12 | The discipline studies the history and stages of the emergence of economic thought, modern views of economic schools, the laws of supply and demand for products, factors of production, the essence of enterprise costs, production theory, Cobb-Douglas function, Lorentz curve, Edgeworth box, the essence and types of inflation, unemployment, the principles of calculating GDP. It consists of the following modules: introduction to economic theory, individual reproduction in a market economy, reproduction of the national economy in market conditions | Fundamentals of Sociology Political Science and Law, math 1,2 | Fundamentals of Management, economics of transport, Diploma design |
| | BD | CC | Design of transport facilities | 120 | 4 | 4 | LO 2 | Mastering the methods of designing individual elements of railway stations and junctions, the main elements of highways, the principles of urban planning, the main elements of airfields and airports and other issues of the fundamentals of the design of communication routes and their content. Must have a large-scale overlay of the main elements of the projected and reconstructed objects, design and calculation. | Math 1,2 | Diploma design |
| | BD | CC | Fundamentals of petrochemical synthesis | 150 | 5 | 4 | LO 10 | The subject of study of this discipline are the following objects: technologies for obtaining raw materials used for organic and petrochemical synthesis processes, technologies for synthesizing aromatic hydrocarbons, various unsaturated compounds and oxygen-containing products based on synthesis gas and oxidation of saturated, unsaturated and aromatic hydrocarbons. | Ecology and life safety, physics, general and inorganic chemistry, colloidal chemistry | Theoretical foundations of organic chemistry, chemistry and technology of heterocyclic compounds, technology of petrochemical industries |

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|--|----|----|----------------------------|-----|---|---|----------------|--|--|--|
| | BD | CC | Colloidal chemistry | 150 | 5 | 3 | LO 3, LO 10 | The discipline considers the most general issues of chemistry related to the study of the interaction of various forms of motion of matter. To develop the ability to analyze the influence of external conditions and the nature of reagents on the main parameters of processes and the course is the basis of general theoretical training of an engineer, as it creates a theoretical basis for his practical activities. In addition, the study of not only the concepts of the basic apparatus, but also computational and experimental methods. | General and inorganic chemistry, oil and gas chemistry, theoretical foundations of organic chemistry | Technology of surface active substances |
| | BD | CC | Analytical Chemistry | 150 | 5 | 4 | LO 3 | The subject of the discipline is mastering the theory and practice of methods of chemical and physico-chemical analysis. Studies qualitative and quantitative methods for studying the chemical composition of compounds and products; chemical methods for analyzing components and objects of industry and the environment and products of man-made activities. The goal is to provide students with scientific and practical training in the basics of analytical chemistry. | General and inorganic chemistry, oil and gas chemistry, theoretical foundations of organic chemistry | Nanotechnology of carbon compounds, gas chemical processes in oil refining |
| | BD | CC | Fundamentals of management | 120 | 4 | 5 | LO 5, LO 12 | The discipline studies the theoretical foundations of management, management principles, management technologies, management processes, interaction of the subject and the object of management, theoretical and practical foundations of modern management, development of management theory and practice, organization as a management function, information and communication management support, management decision-making, management of organizational changes, motivation of activities in management, regulation and control in the management system, assessment of the effectiveness of management at various levels of management. | Fundamentals of economic theory, fundamentals of economics and entrepreneurship | Fundamentals of natural and wastewater treatment technology |

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|--|----|----|--|-----|---|---|------------------------|--|---|--|
| | BD | CC | Economy of transport | 120 | 4 | 5 | LO 4, LO 5, LO 7 | The discipline studies the current state of the transport services market of the Republic of Kazakhstan, the theoretical foundations of solving urgent problems of the economy and management of railway transport, priority areas of development of the national economy and prospects for technical, economic and social development of railway transport, regulatory documents regulating the transport services market, indicators of the use of fixed and working capital, analysis and evaluation of the effectiveness of their use, labor rationing and factors of labor productivity increase. | Math 1,2 | Diploma design |
| | BD | CC | Chemistry of oil and gas | 150 | 5 | 4 | LO 10 | Study of the influence of the physico-chemical properties of the components that make up oil on the way of processing raw materials and the quality of products extracted from it; - determination of the chemistry and mechanism of thermal and catalytic transformations of the main technological processes of refining oil and petroleum products. | Mathematics, Physics, general and inorganic Chemistry, Analytical chemistry, colloidal chemistry, ecology and life safety | Theoretical foundations of organic chemistry, chemistry and technology of heterocyclic compounds, gas chemical processes in oil processing, chemmology, technology of petrochemical industries |
| | BD | CC | Petrochemicals | 180 | 6 | 5 | LO 10 | The study of oil as a natural object and the most important source of chemical raw materials, the study and development of processes for converting oil into chemical products (intermediates, monomers, etc.), the creation of scientific foundations for the production of technically useful products (fuels and oils, additives to fuels and oils, solvents, etc.) and alternative fuels, the study of processes based on chemistry compounds with one carbon atom. | Mathematics, Physics, general and inorganic Chemistry, Analytical chemistry, colloidal chemistry, ecology and life safety | Chemistry and technology of heterocyclic compounds, gas chemical processes in oil refining, chemmology, technology of petrochemical industries |
| | BD | CC | Theoretical foundations of organic chemistry | 180 | 6 | 5 | LO 3, LO 9 | Within the framework of the discipline, it is supposed to study the basic theoretical foundations of organic chemistry, which are necessary for its further deeper understanding. The questions of the structure of organic compounds, stereochemistry, characteristics of electronic and spatial effects, types of reacting organic particles and classification of organic | Physics, general and inorganic Chemistry, Oil and gas chemistry, mathematics, ecology and life safety | Chemistry and technology of heterocyclic compounds, gas chemical processes in oil refining, chemmology, technology of petrochemical industries, basic processes and devices of chemical technology |

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|--|----|----|--|-----|---|---|------------|---|--|---|
| | | | | | | | | reactions are considered. During the study of the discipline, students are advised not to limit themselves to lecture notes, but to use as much material as possible from the given list of references. | | |
| | BD | CC | Gas chemical processes in oil refining | 120 | 4 | 8 | LO 3, LO 9 | To form the ability to analyze modern processes of field preparation of production of wells of gas, gas condensate hydrates. The course forms the skills of qualified use and chemical processing of all components of carbon-containing gas. The discipline is aimed at studying the raw material base of the oil and gas complex, associated petroleum gases, gas condensate, solid gas hydrates, technology of preparation, processing of gas condensate, thermal. | Physics, general and inorganic chemistry, oil and gas chemistry, Mathematics, ecology and life safety, theoretical foundations of organic chemistry, Analytical Chemistry, colloidal Chemistry | Diploma design |
| | BD | CC | Chemistry and technology of heterocyclic compounds | 120 | 4 | 8 | LO 3, LO 9 | To form the ability to apply the basic knowledge of heterocyclic compounds to describe, evaluate and plan the syntheses of various heterocyclic compounds, the course forms a theoretical and methodological basis for understanding the basic laws: structure and reactivity of heterocyclic compounds. The discipline is aimed at studying: classifications, characteristics of properties, methods of synthesis and properties of heterocyclic compounds, their role in the production technologies of important substances and materials. | Physics, general and inorganic chemistry, oil and gas chemistry, Mathematics, ecology and life safety, theoretical foundations of organic Chemistry, Analytical Chemistry, colloidal Chemistry | Diploma design |
| | BD | CC | Technology of surface active substances | 120 | 4 | 6 | LO 9 | The discipline is aimed at developing skills in the analysis, research of properties, practical use of surfactants. The following will be considered: classifications of surfactants, their physico-chemical properties, hydrophilic-lipophilic balance, micelle formation, solubility, solubilization; adsorption, wetting, biodegradability; current technologies for the use of surfactants, the effect of surfactants on the environment. | General and inorganic chemistry, colloidal chemistry, analytical chemistry, theoretical foundations of organic chemistry | Environmental problems of chemical materials production, chemistry and technology of heterocyclic compounds, gas chemical processes in oil refining |
| | BD | CC | Greening of fuels and lubricants | 90 | 3 | 7 | LO 6 | The discipline outlines modern environmental requirements for the quality of fuels and lubricants in the Republic of Kazakhstan and abroad, nomenclature and assortment of fuels and lubricants. Methods of production | Physics, general and inorganic Chemistry, Mathematics, ecology and life safety | Toxicity of transport power plants, fire safety, environmental documentation |

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|--|----|----|---|-----|---|---|-------|--|--|---|
| | | | | | | | | and methods of combustion of solid and liquid fuels. Basic physical and chemical properties of solid, liquid and gaseous fuels. The influence of the quality of fuels and lubricants on environmental pollution. | | |
| | BD | CC | Chemmotology | 90 | 3 | 7 | LO 6 | Based on the knowledge of the laws occurring in the chemmotological system "fuels – lubricants – technical fluids – engines – operation", to ensure the efficient operation of the internal combustion engine, rational use of operational materials and their economy: physico-chemical properties of hydrocarbon raw materials and methods of its processing for the production of fuels and lubricants, gasoline, diesel fuel, gaseous fuels, engine oils, transmission oils, greases, technical fluids. | Physics, general and inorganic Chemistry, Mathematics, ecology and life safety | Toxicity of transport power plants, fire safety, environmental documentation |
| | BD | CC | Basic processes and devices of chemical technology | 120 | 4 | 6 | LO 11 | The course forms a theoretical and methodological basis for understanding the processes of hydrodynamics, heat and mass transfer for analysis, calculation of chemical and technological processes. It is aimed at studying: fundamentals of hydraulics, heat transfer in chemical equipment, physical foundations, kinetic laws and hardware design of mass transfer processes in chemical technology. | Physics, general and inorganic chemistry, mathematics, fundamentals of design, design of transport facilities | Экологические проблемы производств химических материалов, технология нефтехимических производств |
| | BD | CC | Corrosion processes and methods of their prevention | 120 | 4 | 6 | LO 9 | The study of the theoretical foundations of metal corrosion and the main methods of protection of structural materials for the formation of students' correct understanding of the essence of corrosion processes and the competent choice of methods of corrosion protection. Understanding the kinetic laws of anodic dissolution of alloys, the relationship between their corrosion and thermodynamic properties, the study of methods for determining the thermodynamic parameters of components in alloys. | General and inorganic chemistry, colloidal chemistry, Analytical chemistry, Oil and gas chemistry | Greening of fuels and lubricants, chemmotology, fundamentals of natural and wastewater treatment technology, technology of deep oil and gas refining |
| | BD | CC | Control systems of chemical and technological processes | 120 | 4 | 6 | LO 11 | The study of the basic concepts of modern control systems (automated process control systems) and their main characteristics, methods of diagnostics of chemical and technological processes and tools used for this, typical automatic control systems in the chemical industry, the formation of the ability to | Physics, mathematics, general and inorganic chemistry, analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry | Fundamentals of natural and wastewater treatment technology, technology of deep oil and gas processing, environmental problems of chemical materials production, protection of the air basin from pollution |

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| | | | | | | | | design automatic control systems, analyze the technological process as an object of control, the development of functional automation schemes, the formation of skills in the selection of tools diagnostics of chemical technological process, operational control of technological processes. | | |
| | BD | CC | Technology of petrochemical production | 150 | 5 | 7 | LO 9 | Formation of a complex of students' knowledge in the field of chemical methods of processing natural energy carriers and carbon materials, familiarizing them with technologies of organic and petrochemical synthesis, namely, technologies for obtaining raw materials for synthesizing and technologies for synthesizing various organic products themselves - aldehydes, ketones, acids and other oxygen-containing compounds. | General and inorganic chemistry, analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry | Chemistry and technology of heterocyclic compounds, gas chemical processes in oil refining, air basin protection, environmental documentation |
| | BD | CC | Environmental problems of chemical materials production | 150 | 5 | 7 | LO 9 | To introduce the basic principles of analysis and control of technological processes of the chemical industry, to teach students to use normative and methodological literature in the analysis and optimization of technical processes, to form a systematic approach among students in the design of environmentally safe technological processes in the chemical industry, as well as the basic principles of industrial chemical ecology, methodological foundations for the design of environmentally safe chemical industries, as well as measures aimed at protecting the biosphere (atmosphere, hydrosphere, lithosphere) from emissions of industrial enterprises. | General and inorganic chemistry, analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry, ecology and life safety | Chemistry and technology of heterocyclic compounds, gas chemical processes in oil refining, air basin protection, environmental documentation |
| | BD | CC | Rules of technical operation of pipeline transport | 120 | 4 | 8 | LO 8 | The discipline studies the design and features of laying linear pipes and structures, bases for pipelines, principles of pipe connections, different types of construction of oil and gas pipelines, methods of hydraulic calculation of the main pipeline, methods of technological calculation of the oil product pipeline with sequential pumping of oil and gas above the ground, pressure characteristics and oil pipelines and pumping stations with different pressures, methods of pumping | General and inorganic chemistry, oil and gas chemistry, analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry | Environmental problems of production of chemical materials, chemmotology, technology of deep processing of oil and gas |

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|--|----|----|--|-----|---|---|-------|--|---|--|
| | | | | | | | | of high-viscosity petroleum products, features of temperature regimes of main pipelines. | | |
| | BD | CC | Rules of operation of oil storage facilities | 120 | 4 | 8 | LO 8 | The discipline studies general information about the operation and storage of oil and petroleum products in tanks of various volumes, measures to combat oil losses during operation, methods for developing a master plan for the construction area of an oil depot, the design and tanks of an oil depot, the procedure for checking the geometric parameters of the tank body for stability, the rules for measuring and accounting for oil and petroleum products, the method of laying pipelines for the tank farm. | General and inorganic chemistry, oil and gas chemistry, analytical chemistry, colloidal chemistry, theoretical foundations of organic chemistry | Environmental problems of production of chemical materials, chemmotology, technology of deep processing of oil and gas, greening of fuels and lubricants |
| | BD | CC | Renewable energy sources and energy conservation | 150 | 5 | 5 | LO 12 | The discipline studies methods and methods of using unconventional and renewable energy sources, principles of building autonomous energy supply systems based on renewable energy, basic properties, designs and principles of operation of the main energy and auxiliary equipment of renewable energy installations. | Ecology and life safety, physics, general and inorganic chemistry | Electrical safety and lightning protection, fire safety, technology of deep processing of oil and gas |
| | BD | CC | Alternative energy sources | 150 | 5 | 5 | LO 12 | The discipline studies the use of renewable energy sources for energy saving in the power supply of industrial enterprises and electrified railways, taking into account environmental conditions and improving technical and economic indicators. | Ecology and life safety, physics, general and inorganic chemistry | Electrical safety and lightning protection, fire safety, technology of deep processing of oil and gas |

11. Лист согласования

THE CONCLUSION

ОБРАЗОВАТЕЛЬНЫЙ ПРОГРАММЫ

Наименование: 6407100 – Химическая аппаратура

Уровень подготовки: бакалавриат

Код в классификация направлений подготовки: 68071 – Инженерия и инженерное дело

Бюджет группы образовательных программ: В060 – Химическая инженерия и процессы

| № | Ф.И.О. | Место работы, должности | Подпись | Дата |
|---|--------------------|-------------------------|--------------------|----------|
| 1 | Григорьев В. В. | зав. кафе "Восток" | В. В. Григорьев | 15.01.22 |
| 2 | Владимирский В. В. | зав. кафе "Восток" | В. В. Владимирский | 15.01.22 |
| 3 | Александров И. И. | зав. кафе "Восток" | И. И. Александров | 15.01.22 |
| 4 | Косовский Д. Д. | зав. кафе "Восток" | Д. Д. Косовский | 15.01.22 |
| 5 | Смирнов В. В. | зав. кафе "Восток" | В. В. Смирнов | 15.01.22 |
| 6 | Смирнов В. В. | зав. кафе "Восток" | В. В. Смирнов | 15.01.22 |
| 7 | Смирнов В. В. | зав. кафе "Восток" | В. В. Смирнов | 15.01.22 |

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

**на образовательную программу 6В07100-«Химическая инженерия»
направления подготовки 6В071 – Инженерия и инженерное дело
(бакалавриат)**

Представленная образовательная программа **6В07100-«Химическая инженерия» направления подготовки 6В071 – Инженерия и инженерное дело (бакалавриат)**, разработчики: д.х.н., профессор Мельдешов А.А., к.т.н., ассистент профессор Цыганков С.Г., ассоциированный профессор PhD Абдрешов Ш.А., сениор-лектор Курмашев Б.Б. АО «Академии логистики и транспорта» разработана в соответствии с требованиями к содержанию и оформлению образовательных программ. В состав образовательной программы входят следующие структурные элементы: общие сведения, нормативные ссылки, паспорт образовательной программы, компетентная модель выпускника, матрица соотнесения результатов обучения по образовательной программе с учебными дисциплинами, структура образовательной программы, учебный план, каталоги дисциплин вузовского компонента и компонента по выбору.

Образовательная программа **6В07100-«Химическая инженерия» (бакалавриат)** имеет траекторию обучения, которая позволяют выпускнику после обучения легко адаптироваться на любом предприятии и занимать следующие должности: инженер-технолог, химик-технолог, технолог, мастер-технолог, инженер-нефтехимик, инженер научно-исследовательских институтов, оператор технологических установок, инженер по охране труда и технике безопасности, инженер по охране окружающей среды, специалист в области обращения с отходами, нормирования и государственной экологической экспертизы; специалист по гражданской обороне и чрезвычайным ситуациям, научные сотрудники и специалисты разработчики нормативной и технической документации в области охраны труда и защиты окружающей среды, преподаватель средних технических учебных заведений.

Представленная образовательная программа **6В07100-«Химическая инженерия» (бакалавриат)** разработана на высоком профессиональном уровне соответствует требованиям образовательного стандарта и рекомендуется к использованию в учебном процессе технических высших учебных заведений.

Эксперт:

Генеральный директор

ТОО «Институт зеленых химических технологий», д.х.н., профессор



Кадирбеков К.А.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ
на образовательную программу 6B07100-«Химическая
инженерия» направления подготовки 6B071 – Инженерия и
инженерное дело (бакалавриат)

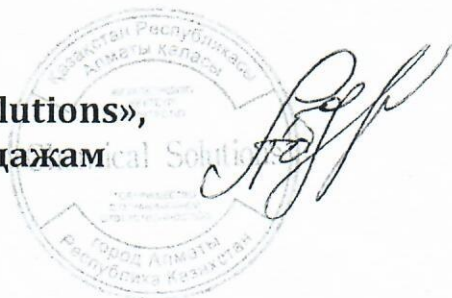
Представленная образовательная программа **6B07100-«Химическая инженерия» (бакалавриат)** разработана преподавателями АО «Академии логистики и транспорта» д.х.н. Мельдешовым А.А., к.т.н., ассистент профессором Цыганковым С.Г., ассоциированным профессором, PhD Абдрешовым Ш.А., сениор-лектором Курмашевым Б.Б.

Образовательная программа **6B07100-«Химическая инженерия»** состоит из следующих разделов:

- Сведения о рассмотрении, согласовании и утверждении программы, разработчиках и экспертах;
- Нормативные ссылки, в котором содержатся названия основных нормативных и правовых документов;
- Паспорт образовательной программы, в котором приводятся основные сведения и цель образовательной программы;
- Компетентная модель выпускника, в котором приводятся задачи образовательной программы, результаты обучения, область, объекты, виды и функции профессиональной деятельности, перечень должностей специалиста, профессиональные сертификаты, получаемые по окончании обучения, требования к предшествующему уровню образования, а также цель и содержание всех видов практик и итоговой аттестации;
- Матрица соотнесения результатов обучения по образовательной программе с учебными дисциплинами/модулями, где приведены сведения о соответствии результатов обучения учебным дисциплинам;
- Структура образовательной программы бакалавриата;
- Учебный план на весь срок обучения;
- Каталог дисциплин вузовского компонента;
- Каталог дисциплин компонента по выбору.

Образовательная программа **6B07100-«Химическая инженерия»** ориентирована на обучающихся и нацелена на обеспечение качества образования. В целом представленная образовательная программа разработана на высоком профессиональном уровне с профессиональным подходом и рекомендуется к использованию в учебном процессе технических высших учебных заведений.

Эксперт:
ТОО «Chemical Solutions»,
директор по продажам



Абдрахманова Г.А.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

**на образовательную программу 6В07100-«Химическая инженерия»
направления подготовки 6В071 – Инженерия и инженерное дело
(бакалавриат)**

Представленная на рецензирование образовательная программа 6В07100 – «Химическая инженерия» (бакалавриат) разработана сотрудниками АО «Академии логистики и транспорта» д.х.н., доцент Мельдешовым А.А., к.т.н., ассистент профессором Цыганковым С.Г., ассоциированным профессором, PhD Абдрешовым Ш.А., сениор-лектором Курмашевым Б.Б.

Образовательная программа 6В07100 – «Химическая инженерия» (бакалавриат) направлена на подготовку специалистов с присуждением академической степени «бакалавр техники и технологии» по образовательной программе 6В07100 – «Химическая инженерия» с нормативным сроком обучения не менее 4-х лет.

Образовательная программа 6В07100 – «Химическая инженерия» содержит:

- 1) теоретическое обучение, включающее изучение циклов общеобразовательных, базовых и профилирующих дисциплин;
- 2) практическое обучение по циклу «Практика»
- 3) промежуточные и итоговые аттестации.

Сферой профессиональной деятельности бакалавра являются все отрасли экономики, включая, индустрию, транспорт, сферы производства и потребления, государственные органы в области прикладной экологии, нефтепереработка, нефтехимия, переработка полимеров, геология, гидрогеология, наук и образование, оборонные предприятия, горнодобывающие отрасли промышленности.

Объектами профессиональной деятельности бакалавра являются: любые предприятия и организации, в том числе и транспортной отрасли, оказывающие влияние на природосоставляющие, техногенные, социальные, информационные системы и их компоненты, факторы, определяющие безопасность жизнедеятельности и защиту окружающей среды, занимающиеся разработкой, внедрением и эксплуатацией технологических систем, проектно-изыскательские и научные институты, конструкторские бюро, фирмы различных форм собственности, предприятия по производству нефтепродуктов, по переработке нефти, газа и угля и полимеров, твердых и жидких топлив, по подготовке, добыче и транспортировке нефтепродуктов и их рационального использования.

Виды профессиональной деятельности:

-проектно-конструкторская;

- сервисно-эксплуатационная;
- организационно-технологическая;
- производственно-управленческая;
- экспертная, надзорная и инспекционно-аудиторская;
- научно-исследовательская;
- образовательная (педагогическая).

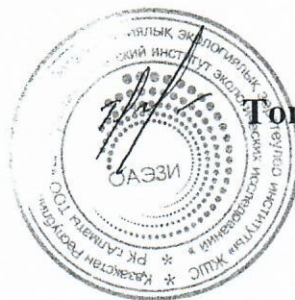
Специалист успешно освоивший все циклы представленной образовательной программы может занимать следующие должности: инженер-технолог, химик-технолог, технолог, мастер-технолог, инженер-нефтехимик, инженер научно-исследовательских институтов, оператор технологических установок, инженер по охране труда и технике безопасности, инженер по охране окружающей среды, специалист в области обращения с отходами, нормирования и государственной экологической экспертизы, специалист по гражданской обороне и чрезвычайным ситуациям, научные сотрудники и специалисты разработчики нормативной и технической документации в области охраны труда и защиты окружающей среды, преподаватель средних технических учебных заведений.

Представленная на рецензирование образовательная программа 6B07100 – **«Химическая инженерия»** (бакалавриат) соответствует требованиям образовательного стандарта, содержит оптимальное количество дисциплин, которые целесообразно распределены по видам занятий и трудоемкости в часах.

Эксперт:

Генеральный директор

**ТОО «Центрально-Азиатский институт
экологических исследований», к.х.н.**



Товасаров А.Д.

Экспертное заключение на образовательную программу, РУП, КЭД

Наименование 6807100 - Качественные инженерные

Уровень подготовки бакалавр

| Показатель | Оценка | |
|---|---------------|------------------|
| | Соответствует | Не соответствует |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа имеет модульную структуру | + | |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа содержит результаты обучения, соответствующие требованиям Национальной рамки квалификаций и Дублинским дескрипторам | + | |
| Результаты обучения сформулированы по всей программе и по каждому модулю | + | |
| Образовательная программа содержит ключевые компетенции | + | |
| Учет результатов обучения ведется в кредитах | + | |
| Образовательная программа разработана совместно с работодателями | + | |
| При разработке образовательной программы учтены новейшие достижения по направлению подготовки, опубликованные в литературе и периодических изданиях, а также результаты собственной научной деятельности академии, других специалистов и ученых | + | |
| КЭД соответствует содержанию образовательной программы и РУП | + | |

Рекомендации эксперта

Рекомендую к внедрению

Внутренний аудитор, эксперт

Зав. каф. "ОПТ"

(должность, ученая степень, звание)

Ильин
(подпись)

Витасюк И
(Ф.И.О.)

Экспертное заключение на образовательную программу, РУП, КЭД

Наименование 6B07100 - Шинеческая инженерия

Уровень подготовки бакалавр

| Показатель | Оценка | |
|---|---------------|------------------|
| | Соответствует | Не соответствует |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа имеет модульную структуру | + | |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа содержит результаты обучения, соответствующие требованиям Национальной рамки квалификаций и Дублинским дескрипторам | + | |
| Результаты обучения сформулированы по всей программе и по каждому модулю | + | |
| Образовательная программа содержит ключевые компетенции | + | |
| Учет результатов обучения ведется в кредитах | + | |
| Образовательная программа разработана совместно с работодателями | + | |
| При разработке образовательной программы учтены новейшие достижения по направлению подготовки, опубликованные в литературе и периодических изданиях, а также результаты собственной научной деятельности академии, других специалистов и ученых | + | |
| КЭД соответствует содержанию образовательной программы и РУП | + | |

Рекомендации эксперта

Рекомендую к внедрению

Внутренний аудитор, эксперт

Зав. кафедрой Лейт
соевч. Курбан А-т,
К. М. Н.

(должность, ученая степень, звание)

Ахмед
(подпись)

Ибралимов Р.О
(Ф.И.О.)

Экспертное заключение на образовательную программу, РУП, КЭД

Наименование БВ 07100 - Химическое машиностроение

Уровень подготовки Бакалавр

| Показатель | Оценка | |
|---|---------------|------------------|
| | Соответствует | Не соответствует |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа имеет модульную структуру | + | |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа содержит результаты обучения, соответствующие требованиям Национальной рамки квалификаций и Дублинским дескрипторам | + | |
| Результаты обучения сформулированы по всей программе и по каждому модулю | + | |
| Образовательная программа содержит ключевые компетенции | + | |
| Учет результатов обучения ведется в кредитах | + | |
| Образовательная программа разработана совместно с работодателями | + | |
| При разработке образовательной программы учтены новейшие достижения по направлению подготовки, опубликованные в литературе и периодических изданиях, а также результаты собственной научной деятельности академии, других специалистов и ученых | + | |
| КЭД соответствует содержанию образовательной программы и РУП | + | |

Рекомендации эксперта

Рекомендую к внедрению

Внутренний аудитор, эксперт

Зав. кафедрой ИКТ
ассист. Профессор
Р.Р.Д.

(должность, ученая степень, звание)

Д.А.А.

(подпись)

Насибева Д.Т.

(Ф.И.О.)

Экспертное заключение на образовательную программу, РУП, КЭД

Наименование БЗОТ 100 - жилищная инженерия

Уровень подготовки бакалавр

| Показатель | Оценка | |
|---|---------------|------------------|
| | Соответствует | Не соответствует |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа имеет модульную структуру | + | |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа содержит результаты обучения, соответствующие требованиям Национальной рамки квалификаций и Дублинским дескрипторам | + | |
| Результаты обучения сформулированы по всей программе и по каждому модулю | + | |
| Образовательная программа содержит ключевые компетенции | + | |
| Учет результатов обучения ведется в кредитах | + | |
| Образовательная программа разработана совместно с работодателями | + | |
| При разработке образовательной программы учтены новейшие достижения по направлению подготовки, опубликованные в литературе и периодических изданиях, а также результаты собственной научной деятельности академии, других специалистов и ученых | + | |
| КЭД соответствует содержанию образовательной программы и РУП | + | |

Рекомендации эксперта

Рекомендую к внедрению

Внутренний аудитор, эксперт

И.О. Жав. кадр. СТДЧ РВ
ассист. прог. АЛТ
к. соц. наук.
 (должность, ученая степень, звание)

(подпись)

Менбаева Д. Ч.
 (Ф.И.О.)

Экспертное заключение на образовательную программу, РУП, КЭД

Наименование БВ 07100 - Лингвистическая информатика

Уровень подготовки Бакалавр

| Показатель | Оценка | |
|---|---------------|------------------|
| | Соответствует | Не соответствует |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа имеет модульную структуру | + | |
| Образовательная программа и РУП разработаны на основе ГОСО | + | |
| Образовательная программа содержит результаты обучения, соответствующие требованиям Национальной рамки квалификаций и Дублинским дескрипторам | + | |
| Результаты обучения сформулированы по всей программе и по каждому модулю | + | |
| Образовательная программа содержит ключевые компетенции | + | |
| Учет результатов обучения ведется в кредитах | + | |
| Образовательная программа разработана совместно с работодателями | + | |
| При разработке образовательной программы учтены новейшие достижения по направлению подготовки, опубликованные в литературе и периодических изданиях, а также результаты собственной научной деятельности академии, других специалистов и ученых | + | |
| КЭД соответствует содержанию образовательной программы и РУП | + | |

Рекомендации эксперта

Рекомендовать к внедрению

Внутренний аудитор, эксперт

Зав. кафедрой ИС
профессор Алат
К.П.Н.

(должность, ученая степень, звание)

Т.А.Алат
(подпись)

Амирбаев Т.К.
(Ф.И.О.)

Уровень подготовки: бакалавриат

Код и группа образовательных программ: В060 – Химическая инженерия и процессы

[illegible]

12. CHANGE REGISTRATION SHEET

| № | Section, paragraph of the document | Type of change (replace, cancel, add) | Number and date of notification | The change has been made | |
|---|---|---|--|--------------------------|--|
| | | | | Date | Surname and initials, signature, position |
| | | | | | |