MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

APPROVED BY THE ACADEMIC COUNCIL

Chairman of the Academic Council KNUTD

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(protocol from «14» 07 2023 №11)

EDUCATIONAL PROFESSIONAL PROGRAM
CHEMICAL TECHNOLOGIES AND ENGINEERING

Level of higher education – first bachelor's degree

Degree of higher education – Bachelor

Knowledge area – 16 Chemical technology and bioengineering

Specialty – 161 Chemical technologies and engineering

Qualification – Bachelor in Chemical technologies and engineering

Kyiv 2023

1. Profile of the educational - professional program
Chemical technologies and engineering

1.1 – General information	
Full names of the higher education institution and structural unit	Kyiv National University of Technologies and Design Department of Chemical Technologies and Resource Saving
Degree of higher education	Level of higher education – bachelor
Educational qualification	Bachelor of Chemical Technology and Engineering
Qualification in diploma	Degree of higher education – bachelor Specialty – 161 Chemical technologies and engineering Educational program – Chemical technologies and engineering
Diploma and the scope	Bachelor's degree, single, 240/180 ECTS credits
Accreditation	Accreditation Certificate of the specialty ND № 1107599 dated 20.06.2023
Cycle / level	the sixth level according to National Qualifications Framework
Prerequisites	Complete general secondary education, professional higher education or junior bachelor's degree (junior specialist). In accordance with the Standard of Higher Education in the specialty based on the degree of junior bachelor (OQR junior specialist), the University recognizes and recalculates ECTS credits received within the previous educational program for junior bachelor (junior specialist)
Language	Ukrainian, English
The validity of the study program	July1, 2025
Web link to the study program description	https://knutd.edu.ua/ekts/

1.2 – The purpose of the educational program
Training of specialists capable of solving complex specialized practical problems of chemical technologies and engineering, characterized by complexity and uncertainty of conditions. The main objectives of the program are to acquire the competencies necessary for professional activities in the field of chemical technology and engineering, in particular in the chemical, leather and textile industries and related; mastering professional knowledge and practical skills in the design and implementation of chemical-technological processes, operation of technological equipment and production systems, evaluation and quality control of products.

1.3 – Characteristics of the educational program	
Subject area	Objects of study and activity – technological processes and apparatus of modern chemical production. Learning objectives – training of specialists capable of solving complex specialized tasks and practical problems of chemical technologies and engineering, characterized by complexity and uncertainty of conditions. Theoretical content of the subject area – concepts, categories, principles of chemical technologies, processes and apparatus of chemical production. Methods, techniques and technologies: physical and chemical methods, modeling and design of chemical processes and apparatus, organizational and technological support. Instruments and equipment: devices and instruments for the analysis of raw materials, intermediates and target products, control and measuring equipment, specialized technological equipment, specialized software. The program is focused on the formation of applicants' competencies for the

	acquisition of deep knowledge, skills and abilities in the specialty. Compulsory educational components – 75%, of them: practical training – 13%, learning a foreign language – 13%. Disciplines of free choice of students: 25% are selected from the university catalogue in accordance with the approved procedure at the University.	
Program orientation	Educational and professional training for a bachelor's degree	
The main focus of the educational program	Emphasis is placed on the formation and development of professional competencies in the field of chemical technology and engineering, the study of organizational and practical tools for the introduction of professional knowledge and skills to solve problems in chemical technology and engineering, in particular in the chemical, leather, textile and related industries.	
Study program features	The program creates conditions for employment of graduates in related fields: food and processing industry, utilization and reuse of waste from the chemical, leather and textile industries, provides an opportunity to carry out scientific and practical activities in the field of chemical technology and engineering. Performed in an active research environment, provides an opportunity to continue studying abroad in related fields. Certain disciplines are taught in English.	
1.4 – Suitability of graduates for employment and further study		
The employment suitability	The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of chemical technology and engineering, in educational institutions, research & development institutes. Professional names of works that can be performed by the graduate: laboratory assistant (chemical and physical research), laboratory technician (chemical and physical research), technician-technologist, technician (chemical technology), laboratory technician (chemical production), trainee researcher and technologist.	
Further study	Opportunity to study according to the educational-scientific and / or educational-professional program of the second (masters) level of higher education.	
1.5 – Teaching and assessment		
Teaching and learning	Student-cantered and problem-oriented learning, learning through training and production practices and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary – active direct participation of research and teaching staff and students of higher education. Forms of organization of the educational process: lecture, seminar, practical, laboratory classes, practical training, independent work, consultation.	
Assessment	Exams, credits, tests, project work, presentations, reports.	
1.6 – Program competencies		
Integral competence (IC)	Ability to solve complex specialized practical problems of chemical technology and engineering, which involves the application of theories and methods of chemical technology and engineering and is characterized by complexity and uncertainty of conditions.	
General competencies (GC)	GC 1	Ability to abstract thinking, analysis and synthesis.
	GC 2	Ability to apply knowledge in practical situations.
	GC 3	Knowledge and understanding the subject area and understanding the professional activity.
	GC 4	Ability to communicate in the state language both orally and in writing.
	GC 5	Ability to communicate in a foreign language.

	GC 6	The desire to preserve the environment.
	GC 7	The ability to exercise their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.
	GC 8	The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the industry, its place in the general system of knowledge about nature and society and in the development of society.
	GC 9	The ability to make decisions and act in accordance with the principle of non-acceptance of corruption and any other manifestations of dishonesty.
Professional competencies (PC)	PC 1	Ability to use the positions and methods of fundamental sciences to solve professional problems.
	PC 2	Ability to use methods of observation, description, identification, classification of chemical technology objects and industrial products.
	PC 3	Ability to design chemical processes taking into account technical, legal and environmental constraints.
	PC 4	Ability to use modern materials, technologies and designs of devices in chemical engineering.
	PC 5	Ability to select and use appropriate equipment, tools and methods for control and management of technological processes of chemical production.
	PC 6	Ability to use computer and information technology to solve complex tasks and practical problems in the field of chemical engineering.
	PC 7	Ability to take into account the commercial and economic context when designing chemical plants.
	PC 8	Ability to draw up technical documentation in accordance with current requirements.
	PC 9	Ability to use modern information resources for analysis and research of chemical technology and engineering.
	PC 10	Ability to apply modern methods of analysis to describe and characterize objects of chemical technology and engineering.
	PC 11	The state of the art is analysed and assessed the structure and power of macromolecular natural, artificial and synthetic materials.
	PC 12	Ability to critically comprehend chemical technologies of leather and fur production and evaluate their impact on the composition and properties of raw materials and final products.
	PC 13	Ability to critically comprehend chemical technologies of polymer processing and evaluate their impact on the properties of final products.
	PC 14	Ability to develop programs for modernization of the existing technological process, using the scientific provisions of the technology of synthetic and natural macromolecular compounds and knowledge of the operation principles of equipment; to improve technological, economic, environmental performance.

	PC 15	Ability to correctly use in professional activities the terminology and basic concepts of chemistry, chemical technologies, processes and equipment for the production of chemicals and materials based on them.
	PC 16	Ability to effectively form a communication strategy.

1.7 – Program learning outcomes	
PLO 1	Know mathematics, physics and chemistry at the level necessary to achieve the results of the educational program.
PLO 2	Know and understand the mechanisms and kinetics of chemical processes and effectively use them in the development and improvement of technological processes and apparatus of the chemical industry.
PLO3	Know and understand the patterns of electrochemical processes and perspectives for their application in various industries.
PLO4	Correctly use in professional activities the terminology and basic concepts of chemistry, chemical technologies, processes and equipment for the production of chemicals and materials based on them.
PLO 5	Ensure the safety of personnel and the environment during professional activities in the field of chemical engineering.
PLO 6	Carry out qualitative and quantitative analysis of substances of inorganic and organic origin, using appropriate methods of general and inorganic, organic, analytical, physical and colloid chemistry.
PLO 7	Develop and implement projects related to technologies and equipment for chemical production, taking into account goals, resources, constraints, social and economic aspects and risks.
PLO8	Understand the basic properties of construction materials, principles and limitations of their application in chemical engineering.
PLO9	Select and use appropriate equipment, tools and methods to solve complex problems of chemical engineering, control and management of chemical production technological processes.
PLO10	Use modern computer and information technology, specialized software to solve complex tasks and practical problems in the field of chemical engineering, in particular, for calculations of equipment and processes of chemical production.
PLO11	Understand the principles of law and legal framework of professional activity.
PLO12	Understanding the chemical engineering as a component of modern science and technology, its place in the development of engineering, the Ukrainian state and world culture.
PLO13	Apply modern research methods to evaluate the properties of macromolecular compounds of natural origin, using knowledge of their structure peculiarities.
PLO14	Analyse chemical technologies of synthetic and natural macromolecular compounds production, assess the impact of technological and physicochemical factors on the composition and properties of raw materials and final products.
PLO15	Substantiate, select and calculate the modern equipment need in the design process of chemical, leather, textile industries to ensure their maximum efficiency.
PLO16	Carry out analysis of raw materials, semi-manufactures, final products and chemical materials using modern methods and devices to achieve sufficient measurement accuracy and reliability of results.
PLO17	Correlate the results of experimental research and mathematical modelling of chemical and chemical-technological processes with the corresponding theories.

PLO18	Be able to convey to professionals and non-specialists information, ideas, problems, solutions and personal experience in the field of chemical engineering in the state and one of the main European languages.
PLO19	Ability to make and justify the choice of technological equipment, use computer-aided design systems to develop technological and hardware scheme of chemical-technological industries.
PLO 20	Search technical and patent literature; critically use scientific and other sources of information, using their analysis to study data objects of chemical technology and engineering.
PLO 21	To carry out technical and economic substantiation of chemical production, to possess methods of improvement of technological process, to understand theoretical and practical approaches to creation and management of production.
PLO 22	Discuss the results of professional activities with specialists and non-specialists, argue their own position.
PLO 23	Communicate freely on professional issues orally and in writing in the state and foreign languages.
1.8 - Resource support for program implementation	
Staffing	All scientific and pedagogical workers who carry out the educational and professional program correspond to the profile and direction of the disciplines taught by qualification; they have the necessary experience of pedagogical and practical work. Specialists with experience in scientific, managerial, innovative, creative and professional work, foreign teachers are involved in the organization of the educational process.
Logistics	Logistical support allows for a full educational process throughout the training cycle of the educational program. Sanitary and technical passports certify the condition of the premises, which corresponds to the current regulations.
Information and methodical support	The program is fully equipped with an educational and methodological complex of all components of the educational program, the availability of which is presented in the modular environment of the educational process of the University.
1.9 - Academic mobility	
National credit mobility	Provides for the possibility of academic mobility in some components of the educational program, providing the acquisition of general and / or professional competencies.
International credit mobility	The program opens up prospects for participation and internships in research projects and academic mobility programs abroad; conducted in an active research environment.
Studying for foreign students	Training of foreign applicants for higher education is carried out according to accredited educational programs.

2. The list of components of the educational-professional program and their logical sequence

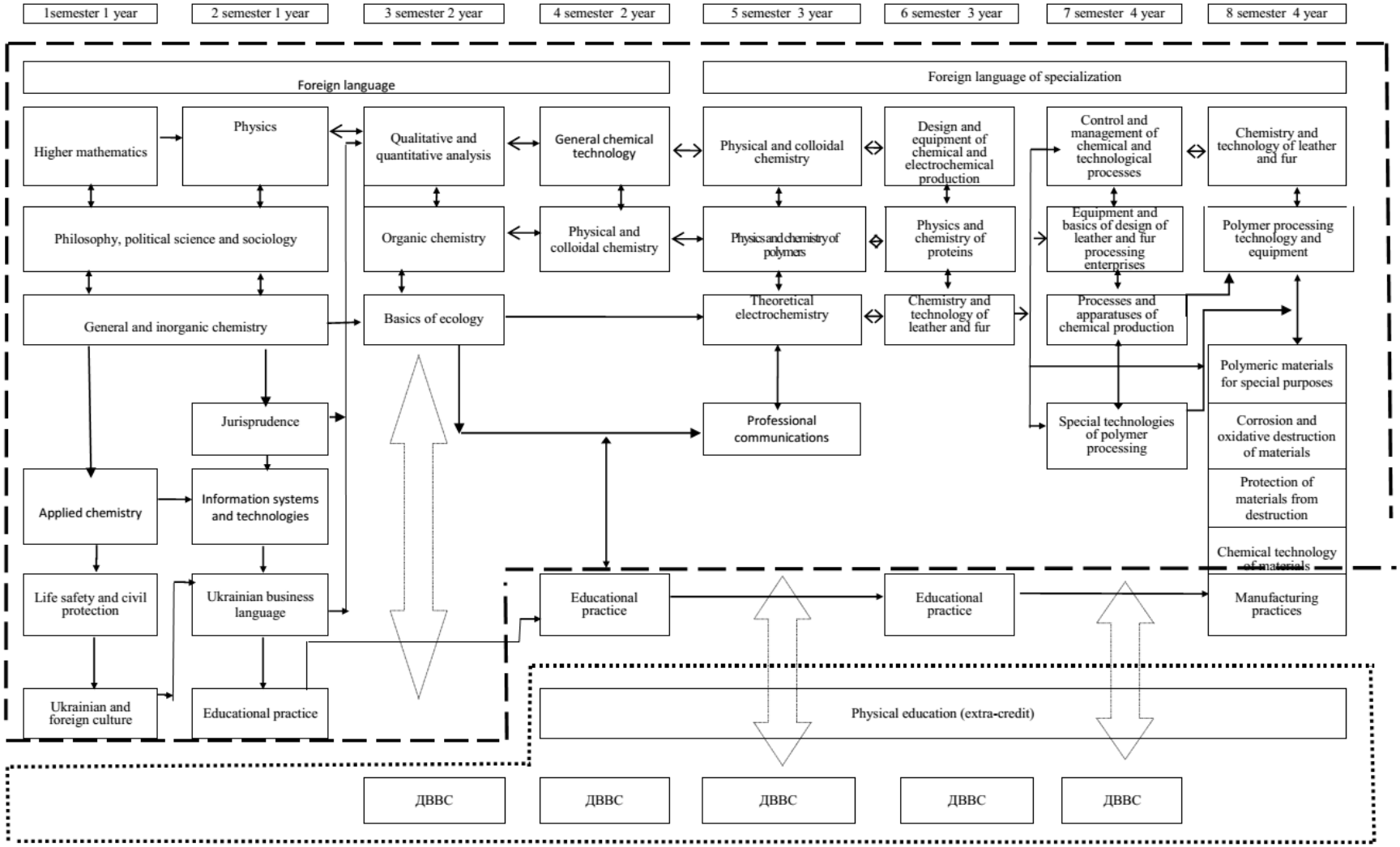
2.1 List of components of the educational-professional program of the first (bachelor's) level of higher education

Cod	Components of the study program (study courses, courses projects (works), practices, qualification work)	Number of credits	Form of control
1	2	3	4

Compulsory components			
CC 1	Ukrainian and foreign culture	2	test
CC 2	Foreign language	12	exam
CC 3	Business Ukrainian language	2	test
CC 4	Philosophy, political science and sociology	4	exam
CC 5	Foreign language of professional orientation	8	exam
CC 6	Life safety and civil protection	2	exam
CC 7	General and inorganic chemistry	14	exam
CC 8	Higher mathematics	6	exam
CC 9	Physics	6	exam
CC 10	Applied chemistry	6	test
CC 11	Science of law	2	test
CC 12	Physical education	2	test
CC 13	Information systems and technologies	2	exam
CC 14	Qualitative and quantitative analysis	6	exam
CC 15	Organic chemistry	6	exam
CC 16	Fundamentals of ecology	3	test
CC 17	Processes and apparatus of chemical production	2	exam
CC 18	General chemical technology	6	exam
CC 19	Physical and colloid chemistry	7	exam
CC 20	Physics and chemistry of polymers	6	exam
CC 21	Professional communications	2	test
CC 22	Electrochemistry	4	exam
CC 23	Design and equipment of chemical and electrochemical productions	3	exam
CC 24	Physics and chemistry of proteins	2	exam
CC 25	Chemistry and technology of leather and fur	5	exam
CC 26	Equipment and basics of designing the leather and fur processing enterprises	4	exam
	Course work	1	test
CC 27	Control and management of chemical-technological processes	3	test
CC 28	Special technologies of polymer processing	3	exam
CC 29	Chemical technology of materials	3	exam
CC 30	Special purpose polymeric materials	6	test
CC 31	Polymer processing technology and equipment	4,5	exam
	Course project	1,5	test
CC 32	Corrosion and oxidative degradation of materials	3	test
CC 33	Protection of materials from destruction	3	exam
CC 34	Educational practice	24	test
CC35	Industrial practice	18	test
CC36	Attestation examination	6	exam
The total amount of required components		**180**	
Selective components of the educational program			
SCEP	Disciplines of free choice of the student	60	test
The total amount of sample components		**60**	
TOTAL CREDITS		**240**	

[1] – non-credit discipline

2.2. Structural and logical scheme of training bachelors of the educational and professional program Chemical Technology and Engineering with specialty 161 Chemical Technology and Engineering



3. Form of attestation of higher education applicants

Forms of attestation for higher education applicants	The graduation attestation of the educational program is conducted in the form of a qualification examination.
Requirements for the qualification examination in the specialty	The qualification examination in the specialty assesses the learning outcomes defined by the standard and the educational program. The examination program includes test questions from the following courses: “General and Inorganic Chemistry”, “Physical and Colloid Chemistry”, “Physics and Chemistry of Polymers”, “Technology and Equipment for Polymer Processing”, “Chemistry and Technology of Leather and Fur”, “Electrochemistry”, as well as a calculation-and-practical task from the course “General Chemical Technology”. Answers to the test questions are assessed for 60 points — 10 points per question for each course. The calculation-and-practical task is assessed for 40 points, taking into account the correctness and completeness of the answer, the accuracy of mathematical calculations, and the units of measurement.

4. Matrix of Alignment of Program’s Competences with Educational Program Components

	GC 1	GC 2	GC 3	GC 4	GC 5	GC 6	GC 7	GC 8	GC 9	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12	PC 13	PC 14	PC 15	PC 16
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CC 34	*															*		*						*	
CC 35		*	*					*		*	*			*	*		*								*

5. Matrix of ensuring program learning outcomes with the corresponding components of the educational-professional program

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15	PLO 16	PLO 17	PLO 18	PLO 19	PLO 20	PLO 21	PLO 22	PLO 23
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