

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

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 2021

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

1 – General information	
Full names of the higher education institution and structural unit	Kyiv National University of Technologies and Design Department of Applied Ecology, Technology of Polymers and Chemical Fibers Department of biotechnology, leather and fur Department of Electrochemical Power Engineering & Chemistry
Degree of higher education and qualification	Level of higher education - first (bachelor) Degree of higher education - bachelor Knowledge area – 16 Chemical technology and bioengineering Specialty - 161 Chemical technologies and engineering
Diploma and the scope	Bachelor's degree, single, 240/180 ECTS credits
Accreditation	Accreditation Certificate of the specialty ND № 1190193 dated October 23, 2017.
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
The validity of the study program	July1, 2025
Web link to the study program description	https://en.knutd.edu.ua/ects/
2 – The purpose of the educational program	
<p>Training of specialists capable of solving complex specialized practical problems of chemical technologies and engineering, characterized by complexity and uncertainty of conditions.</p> <p>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.</p>	
3 – Characteristics of the educational program	
Subject area	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 which: disciplines of general training – 10%, vocational training – 64%, practical training – 13%, learning a foreign language – 13%. Disciplines of free choice of students: 25% are selected from the university catalog 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.	
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.	
5 – Teaching and assessment		
Teaching and learning	Student-centered 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, development of professional projects (works).	
Assessment	Exams, credits, tests, project work, presentations, reports.	
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.

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.
7 – Program learning outcomes		
Knowledge and understanding:		
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.	

Application of knowledge and understanding (skills):	
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.
Formation of judgments:	
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.

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. The condition of the premises is certified by sanitary and technical passports, 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.
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			
General courses cycle			
CC 1	Ukrainian and foreign culture	3	test
CC 2	Foreign language (English , German , France)	12	exam
CC 3	Business Ukrainian language	3	test
CC 4	Philosophy, political science and sociology	6	exam
CC 5	Foreign language of professional orientation (English , German)	12	exam
CC 6	Life safety and civil protection	3	exam
CC 7	Science of law	3	test
	Physical education¹	-	-
Total for the cycle		42	
Professional courses cycle			
CC 8	General and inorganic chemistry	9	exam
CC 9	Higher mathematics	6	exam
CC 10	Physics	6	exam
CC 11	Applied chemistry	6	test
CC 12	Information systems and technologies	3	exam
CC 13	Qualitative and quantitative analysis	6	exam
CC 14	Organic chemistry	6	exam
CC 15	Fundamentals of ecology	3	test
CC 16	Processes and apparatus of chemical production	3	exam
CC 17	General chemical technology	6	exam
CC 18	Physical and colloid chemistry	6	exam
CC 19	Physics and chemistry of polymers	6	exam
CC 20	Professional communications	3	test
CC 21	Theoretical electrochemistry	3	exam
CC 22	Design and equipment of chemical and electrochemical productions	3	exam
CC 23	Physics and chemistry of proteins	3	exam
CC 24	Chemistry and technology of leather and fur	3	exam
CC 25	Equipment and basics of designing the leather and fur processing enterprises	6	exam
CC 26	Control and management of chemical-technological processes	3	test
CC 27	Special technologies of polymer processing	3	exam
CC 28	Chemical technology of materials	3	exam
CC 29	Special purpose polymeric materials	6	test
CC 30	Polymer processing technology and equipment	6	exam
CC 31	Corrosion and oxidative degradation of materials	3	exam
CC 32	Protection of materials from destruction	3	test
	Practical training	24	
CC 33	Educational practice	18	test
CC 34	Industrial practice	6	test
Total from the cycle		138	
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