

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

EDUCATIONAL PROFESSIONAL PROGRAM  
**CHEMICAL PROCESSING TECHNOLOGIES  
OF POLYMER AND COMPOSITE MATERIALS**

Level of higher education – second Master’s degree

Degree of higher education – Master

Knowledge area – 16 Chemical technology and bioengineering

Specialty – 161 Chemical technologies and engineering

Qualification – Master in Chemical technologies and engineering

Kyiv 2021

# 1. Profile of the educational - professional program CHEMICAL PROCESSING TECHNOLOGIES OF POLYMER AND COMPOSITE MATERIALS

<b>1 – General information</b>	
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
Degree of higher education and qualification	Level of higher education - second (master) Degree of higher education - master Knowledge area – 16 Chemical technology and bioengineering Specialty - 161 Chemical technologies and engineering
Diploma and the scope	Master's degree, single, 90 ECTS credits.
Accreditation	Accreditation Certificate of the specialty UD № 11007788 dated January08, 2019.
Cycle / level	the seventh level according to National Qualifications Framework
Prerequisites	Bachelor degree
Language	Ukrainian
The validity of the study program	July1, 2025
Weblink to the study program description	<a href="https://en.knutd.edu.ua/ects/">https://en.knutd.edu.ua/ects/</a>
<b>2 – The purpose of the educational program</b>	
<p>Training the specialists which capable to solving the complex tasks and problems of chemical technologies and engineering, which involves conducting research and/or innovation under uncertain conditions and requirements. Training the specialists who have deep knowledge, as well as basic and professional competencies in the field of chemical technology for polymeric and composite materials processing, are aimed at obtaining the professional training at the modern level, which is necessary for employment and self-realization in society.</p> <p>The graduate must have knowledge in the field of polymer and composite materials, technological processes, operation of technological equipment and production systems, must be aware with the basics of design, have practical skills needed to assess and control the quality of polymer products, and can organize, improve the design and management of production processes using special software.</p>	
<b>3 – Characteristics of the educational program</b>	
Subject area	The program is focused on the formation of applicants' for competencies to acquire deep knowledge, skills and abilities in the specialty. Compulsory educational components – 73%, of which: disciplines of general training – 10 %, vocational training –20 %, practical training – 17%, learning a foreign language – 3%, diploma design – 23 %. Disciplines of free choice of students – 27% are selected from the university catalog in accordance with the approved procedure at the University.
Program orientation	Educational and professional training for a master's degree.
The main focus of the educational program	Emphasis is placed on the formation and development of professional competencies to solve problems in the field of chemical technology of processing of polymeric and composite materials, on active involvement of students in R&D on fundamentals and applied research in the field of polymeric and fibrous materials. The program is aimed at the development of professional self-improvement, creative thinking in search of new polymer and composite materials and technologies for their production.

Study program features	<p>The program provides in-depth theoretical, special R&amp;D and practical training in the field of chemical technology and engineering, opens prospects for internships and employment in modern enterprises in the fields of: chemical processing of polymer and composite materials, food and processing industries; recycling and reuse of waste polymeric and textile materials.</p> <p>The program is implemented in an active research environment and provides opportunities for the implementation of international academic mobility. Certain disciplines are taught in English.</p>	
<b>4 – Suitability of graduates for employment and further study</b>		
The employment suitability	<p>Professional activity in the field of chemical engineering.</p> <p>The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of chemical technology and engineering, in educational institutions, R&amp;D institutes.</p> <p>The graduates can work in the following positions: chemist, chemist-analyst, research engineer, engineer-technologist (chemical technology), engineer (chemical technology), environmental engineer, engineer-technologist for water purification, assistant.</p>	
Further study	<p>Lifelong learning to improve professional, scientific and other activities.</p> <p>Possibility to continue training according to the educational-scientific program of the third (educational-scientific) level of higher education (doctor of philosophy).</p>	
<b>5 – Teaching and assessment</b>		
Teaching and learning	<p>Student-centered and problem-oriented learning, research practice 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 higher education. Forms of organization of the educational process are lecture, seminar, practical, laboratory classes, practical training, independent work, consultation, development of professional projects (works).</p>	
Assessment	<p>Exams, tests, project work, presentations, reports.</p>	
<b>6 – Program competencies</b>		
Integral competence (IC)	<p>Ability to solve of the complex tasks and problems of chemical technology and engineering or in the learning process, which involves conducting research and/or innovation under uncertain conditions and requirements.</p>	
General competencies (GC)	GC 1	Ability to generate new ideas (creativity).
	GC 2	Ability to apply knowledge in practical situations.
	GC 3	Ability to search, process and analyse information from various sources.
	GC 4	Ability to perform of the experiments independently, as well as independently describe, analyse and critically evaluate experimental data.
Professional competencies (PC)	PC 1	Ability to research, classify and analyse of the quality indicators for chemical products, technological processes and equipment for chemical productions.
	PC 2	Ability to organize and manage chemical-technological processes in the industrial conditions and in R&D laboratories taking into account social, economic and ecological aspects.
	PC 3	Ability to use the R&D results to improve existing and / or develop new technologies and equipment for chemical production.
	PC 4	Ability to use modern special scientific equipment and software in conducting R&D in the field of chemical technology and engineering.
	PC 5	Ability to make a rational choice of equipment for the production of polymeric and composite materials, based on functional efficiency and material costs.

	PC 6	Ability to organize and conduct briefings, training and control classes with workers on safe work organization, industrial ecology, etc.
	PC 7	Ability to communicate in the professional sphere orally and in writing in state and foreign languages.
<b>7 – Program learning outcomes</b>		
Knowledge and understanding:		
PLO 1	To know the basic laws of development and modern achievements in the technology of polymer and composite materials.	
PLO 2	To know modern methods for research of the properties of polymer composite fibrous materials.	
PLO3	To know domestic legislation in the field of copyright. To be able to protect your intellectual property and avoid infringements of other people's intellectual property.	
Application of knowledge and understanding (skills):		
PLO4	Critically comprehend scientific concepts and modern theories of chemical processes and chemical engineering, apply them in research and innovation.	
PLO 5	To search for the necessary information regarding chemical technology, processes and equipment for the production of chemicals and materials based on them, to systematize, analyze and evaluate relevant information.	
PLO 6	To organize own work and work of employees of the industrial enterprise, design divisions, R&D laboratories, to define the purposes and effective ways of their achievement, to motivate and train the personnel.	
PLO 7	To evaluate the technical and economic characteristics of the results of R&D, technology and equipment of chemical production.	
PLO8	To develop and implement projects in the field of chemical technology and related interdisciplinary projects, taking into account social, economic, environmental and legal aspects.	
PLO9	To search for the necessary information in the scientific and technical literature, patents, databases, other sources in relation to chemical technology, processes and equipment for the production of chemicals and materials based on them, systematize, and analyze and evaluate relevant information.	
PLO10	To understand the role of innovative technologies of polymer and composite materials in the development of industrial potential of the country	
Formation of judgments:		
PLO 11	Substantiation of the program of modernization of the current technological process (object), using the scientific provisions of the technology of polymer and composite materials, the principles of equipment's work in order to improve it technological, economic, environmental performance.	
PLO12	Communicate fluently in state and foreign languages orally and in writing to present and discuss the results of professional R&D activities, research and projects.	
<b>8 - Resource support for program implementation</b>		
<b>Staffing</b>	All scientific and pedagogical workers who provide the educational program on qualification correspond to a profile and a direction of the educational components, which are taught; have the necessary experience of pedagogical and practical work. Professionals with experience in research / management / innovation / creative work and / or work in the specialty are involved in the organization of training.	
<b>Logistics</b>	Logistics allows to fully ensuring the educational process throughout the training cycle in the specialty. Equipment in the educational and scientific laboratory includes the necessary technical support for research, equipped with computer and multimedia equipment, applications.	

	Sanitary and technical passports that comply with current regulations certify the condition of the premises.
<b>Information and methodical support</b>	The program is fully equipped with an educational and methodological complex of all educational components, which are presented in the modular system of the educational process of the university.
<b>9 - Academic mobility</b>	
<b>National credit mobility</b>	Provides for the possibility of academic mobility in some educational components that ensure the acquisition of general or professional competencies.
<b>International credit mobility</b>	The program opens up prospects for participation and internships in R&D projects and academic mobility programs abroad. Performed in an active research environment.
<b>Studying for foreign students</b>	Training the 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 second (Master'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
<b>Compulsory components</b>			
General courses cycle			
CC 1	<a href="#">Methodology of modern scientific researches with the basics of intellectual property</a>	3	exam
CC 2	Business Foreign Language ( <a href="#">English</a> , <a href="#">German</a> , <a href="#">France</a> )	3	test
CC 3	Labor protection in the industry	3	test
Total for the cycle		9	
Professional courses cycle			
CC 4	<a href="#">Physico-chemical properties of polymers and methods of their control</a>	6	exam
CC 5	<a href="#">Functional polymer composites</a>	3	exam
CC 6	<a href="#">Innovative technologies of polymeric materials</a>	6	exam
CC 7	<a href="#">Polymer nanotechnologies</a>	3	exam
CC 8	<a href="#">Design of plastics processing enterprises</a>	3	Test
CC 9	Research practice Pre-diploma practice	15	Test
CC 10	Master`s thesis (project)	21	attestation
<b>The total amount of required components</b>		<b>66</b>	
<b>Selective components of the educational program</b>			
<b>SCEP</b>	Disciplines of free choice of the student	24	Test
<b>The total amount of sample components</b>		<b>60</b>	
<b>TOTAL CREDITS</b>		<b>90</b>	

<sup>1</sup> – Non-credit discipline