MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

APPROVED BY THE SCIENTIFIC COUNCIL
Chairman of the Academic Council of KNUTD
_____ Ivan Gryshchenko
(protocol from «___»_____2021 №__)

EDUCATIONAL AND PROFESSIONAL PROGRAM

ELECTROMECHANICS

Level of higher education first (bachelor)

Higher education degree bachelor

Field of knowledge 14 Electrical Engineering

Specialty 141 "Electrical power engineering, electrical engineering and electromechanics"

Qualification bachelor of electrical power engineering, electrical engineering and electromechanics"

Kyiv 2021

1. Profile of educational and professional program
Electromechanics

1 – General information	
Full name of the higher educational institution and structural subdivision	Kyiv National University of Technology and Design. Department of Computer Engineering and Electromechanics.
Higher education degree and qualification in the original language	The level of higher education is the first (bachelor's). Degree of higher education - bachelor. Field of knowledge - 14 Electrical engineering. Specialty - 141 Electric power , electrical engineering and electromechanics.
Type of diploma and scope of educational program	Bachelor's degree, single, 240 ECTS credits / 180 ECTS credits for a reduced period of study.
Availability of accreditation	Certificate of accreditation of UD № 11005758 dated November 6, 2018.
Cycle / level	The National Qualifications Framework of Ukraine is the sixth level.
Prerequisites	Complete general secondary education, professional higher education or junior bachelor's degree (junior specialist). According to the Standard of Higher Education in the specialty based on the degree of junior bachelor (OQR of the junior specialist), the University recognizes and recalculates ECTS credits received within the previous educational program of junior bachelor (junior specialist).
Language (s) of instruction	Ukrainian.
Term of the educational program	July 1, 2023
Internet - the address of the permanent placement of the description of the educational program	http://knutd.com.ua/admissions_main/prifile/
2 – Objective of educational program	
Training of specialists with in-depth knowledge, as well as basic and professional competencies in the field of power engineering, electrical engineering and electromechanics, aimed at acquiring the student's knowledge, skills and abilities necessary for employment and ensuring his ability to work. The main objectives of the program are: training of specialists capable of independently using and implementing electrical engineering technologies; formation and development of general and professional competencies in the field of power engineering, electrical engineering and electromechanics, aimed at acquiring the knowledge, skills and abilities necessary for the design, creation and maintenance of electromechanical devices and systems.	
3 – Characteristics of the educational program	
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 - 75%, of which: disciplines of general training - 30%, vocational training - 44%, 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.

Orientation of the educational program	Educational and professional for bachelor's degree preparation.	
The main focus of the program	Emphasis is placed on the formation and development of professional competencies in the field of power engineering, electrical engineering and electromechanics; study of theoretical and methodological provisions, organizational and practical tools for designing, creating and maintaining electromechanical devices and systems.	
Features of the educational program	The educational-professional program develops theoretical and practical training in the field of design, creation and service of electromechanical devices and systems, and also introduction of innovative information technologies in the household sphere.	
4 – Suitability of graduates for employment and further study		
Suitability for employment	The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of power engineering, electrical engineering and electromechanics. Professional names of works that can be performed by the applicant: site electrician; shop electrician; electromechanic; site electrician; electromechanic of the radio navigation system; energy; site power engineer; shop engineer; electrician; energy technician.	
Further study	Opportunity to study according to the educational-scientific and / or educational-professional program of the second (master's) level of higher education.	
5 – Teaching and assessment		
Teaching and learning	Student-centered and problem-oriented learning, learning through educational, industrial, undergraduate 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 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	Testing of knowledge, presentations, reports on laboratory works, reports on practice, control works, course (project) works, tests, examinations, public defense of qualifying work.	
6 – Program competencies		
Integral competence (IC)	Ability to solve specialized problems and solve practical problems during professional activities in the field of power engineering, electrical engineering and electromechanics or in the learning process, which involves the application of theories and methods of physics and engineering and are characterized by complexity and uncertainty.	
General competencies (GC)	GC 1	Ability to abstract thinking, analysis and synthesis.
	GC 2	Ability to apply knowledge in practical situations.
	GC 3	Ability to communicate in the state language both orally and in writing.
	GC 4	Ability to communicate in a foreign language.
	GC 5	Ability to search, process and analyze information from various sources.
	GC 6	Ability to identify, pose and solve problems.
	GC 7	Ability to work in a team.
	GC 8	Ability to work autonomously.
	GC 9	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 10	Ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies. active recreation and a healthy lifestyle.
Professional competencies (PC)	PC 1	Ability to solve practical problems using computer-aided design and calculation (CAD) systems.
	PC 2	Ability to solve practical problems involving methods of mathematics, physics and electrical engineering.
	PC 3	Ability to solve complex specialized problems and practical problems related to the operation of electrical systems and networks, electrical part of stations and substations and high voltage equipment.
	PC 4	Ability to solve complex specialized problems and practical problems related to the problems of metrology, electrical measurements, operation of automatic control devices, relay protection and automation.
	PC 5	Ability to solve complex specialized problems and practical problems related to the operation of electric machines, devices and automated electric drive.
	PC 6	Ability to solve complex specialized problems and practical problems related to the problems of production, transmission and distribution of electricity.
	PC 7	Ability to develop projects of electric power, electrotechnical and electromechanical equipment in compliance with the requirements of legislation, standards and specifications.
	PC 8	Ability to perform professional duties in compliance with the rules of safety, labor protection, industrial sanitation and environmental protection.
	PC 9	Awareness of the need to increase the efficiency of electrical, electrical and electromechanical equipment.
	PC 10	Awareness of the need to constantly expand their knowledge of new technologies in power engineering, electrical engineering and electromechanics.
	PC 11	Ability to promptly take effective measures in emergency (emergency) situations in power and electromechanical systems.
	PC 12	Ability to use and implement innovative information technologies and systems.
7 – Program learning results		
Knowledge and understanding:		
PLR 1	Know and understand the principles of operation of electrical systems and networks, power equipment of power plants and substations, protective earthing and lightning protection devices and be able to use them to solve practical problems in professional activities.	
PLR 2	Know and understand the theoretical foundations of metrology and electrical measurements, the principles of automatic control devices, relay protection and automation, have the skills to perform appropriate measurements and use these devices to solve professional problems.	

PLR 3	Know the principles of operation of electric machines, devices and automated electric drives and be able to use them to solve practical problems in professional activities.
PLR 4	Know the principles of operation of bioenergy, wind, hydro and solar power plants.
PLR 5	Know the basics of the theory of the electromagnetic field, methods of calculating electric circuits and be able to use them to solve practical problems in professional activities.
PLR 6	Have knowledge in the field of innovative information technologies and systems.
PLR 7	Know the requirements of regulations relating to engineering, protection of intellectual property, labor protection, safety and industrial sanitation, take them into account when making decisions.
PLR 8	Understand the importance of traditional and renewable energy for successful economic development.
Application of knowledge and understanding (skills)::	
PLR 9	Use application software, microcontrollers and microprocessor technology to solve practical problems in professional activities.
PLR 10	To carry out the analysis of processes in the electric power, electrotechnical and electromechanical equipment, the corresponding complexes and systems.
PLR 11	Select and apply suitable methods for analysis and synthesis of electromechanical and electrical systems with specified parameters.
PLR 12	Be able to assess the energy efficiency and reliability of electrical, electrical and electromechanical systems.
PLR 13	Find the necessary information in the scientific and technical literature, databases and other sources of information, assess its relevance and reliability.
PLR 14	Investigate and analyze physical phenomena and processes in electrical, electrical and electromechanical equipment.
PLR 15	Solve complex specialized problems in the design and maintenance of electromechanical systems, electrical equipment of power plants, substations, systems and networks.
PLR 16	Be able to learn independently, acquire new knowledge and improve skills in working with modern equipment, measuring equipment and application software.
PLR 17	Apply suitable empirical and theoretical methods to reduce electricity losses during its production, transportation, distribution and use.
PLR 18	Be able to apply knowledge in the field of innovative information technologies and systems to solve practical problems.
Formation of judgments:	
PLR 19	To communicate freely on professional problems in the state and foreign languages orally and in writing, to discuss the results of professional activity with specialists and non-specialists, to argue their position on debatable issues.
PLR 20	Understand the basic principles and objectives of technical and environmental safety of electrical and electromechanical objects, take them into account when making decisions.
PLR 21	Understand the principles of European democracy and respect for the rights of citizens, take them into account in decision-making.
PLR 22	Understand and demonstrate good professional, social and emotional behavior, follow a healthy lifestyle.
8 – Resource support for program implementation	
Staffing	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 work and experience of practical work. In the process of organizing training, professionals with experience in research / management / innovation / creative work and / or work in the specialty are involved.
Logistics	Logistics allows to fully ensure the educational process throughout the training cycle of the educational program. The condition of the premises is certified by sanitary and technical passports that comply with current regulations.
Information and educational 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 develops prospects for participation and internships in research projects and academic mobility programs abroad.
Training of foreign applicants for higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

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

2.1 The list of components of the educational and professional program

Code	Components of the educational program (academic disciplines, term papers (projects), practices, qualification work)	Number of credits	Form of final control
1	2	3	4
Mandatory components of the educational program			
General training cycle			
EC 1	Business Ukrainian language	3	credit
EC 2	Foreign Language(english, german, france)	12	exam
EC 3	Ukrainian and foreign culture	3	credit
EC 4	Philosophy, political science and sociology	6	exam
EC 5	Physical Education	3/9*	credit
EC 6	Higher mathematics	12	exam
EC 7	Probability theory and mathematical statistics	3	exam
EC 8	Physics	12	exam
EC 9	Theory of automatic control.	3	exam
EC 10	Computer graphics and multimedia	6	exam
EC 11	Theoretical foundations of electrical engineering	3	exam
EC 12	Life safety and civil protection	3	exam
EC 13	Entrepreneurial business	3	exam
	Total from the cycle	72	
EC 14	Foreign language of professional orientation (english, german)	12	exam
EC 15	Electrical machines and apparatus.	6	exam
EC 16	Theory of the electric drive	6	exam
EC 17	Measurement in electrical power engineering, electrical engineering and electromechanics	6	credit
EC 18	Electrical systems and networks	6	exam
EC 19	Applied mechanics.	3	credit
EC 20	Information processing in interactive environments	6	exam
EC 21	Computer aided design technologies	6	exam
EC 22	Calculation and design of electromechanical devices	6	credit
EC 23	Innovative information technologies and systems	3	exam
EC 24	Computer control systems	6	exam
EC 25	Mathematical and computer modeling of systems.	6	credit
EC 26	Educational practice	6	credit
EC 27	Internship	12	credit
EC 28	Pre-diploma practice	6	credit
EC EC 29	Thesis bachelor's thesis (project)	12	attestation
	Total from the cycle	108	
	The total amount of required components	**180**	
Selective components of the educational program			
DFCS	Disciplines of free choice of the student	60	залік
	The total amount of selective components	**60**	
	TOTAL VOLUME OF THE EDUCATIONAL PROGRAM	**240**	

* Non-credit academic discipline in 2, 3, 4 semesters.