

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
UKRAINIAN STATE UNIVERSITY OF RAILWAY TRANSPORT

APPROVED

The minutes of the meeting of the
academic council
of the Ukrainian State
University of Railway Transport
June 29, 2023 No. 5

To be implemented from 2023/2024
academic year

Rector

_____Serhiy PANCHENKO

**EDUCATIONAL AND PROFESSIONAL PROGRAM OF HIGHER
EDUCATION**

**AUTOMATION, COMPUTER-INTEGRATED TECHNOLOGIES AND
ROBOTICS**

(project)

Level of higher education: second
Degree of higher education: master's degree
Field of knowledge: 17 Electronics, automation, and electronic
communications
Specialty: Automation, computer-integrated technologies, and
robotics

Kharkiv – 2023

1. Preface

The Law of Ukraine "On Higher Education" establishes that:

1) educational and professional program – a single complex of educational components (educational disciplines, individual tasks, practices, control measures, etc.) aimed at achieving the learning outcomes provided for by such a program, which gives the right to obtain a specified educational or professional qualification;

2) the standard of higher education defines the following requirements for the educational program:

- the volume of ECTS credits necessary for obtaining the corresponding degree of higher education;

- requirements for the level of education of persons who can start studying under this program, and the results of their studies;

- a list of mandatory graduate competencies;

- the normative content of the training of higher education applicants, formulated in terms of learning outcomes;

- attestation forms of higher education applicants;

- requirements for the creation of educational training programs by field of knowledge, two fields of knowledge or a group of specialties (in the standards of the junior bachelor's level), interdisciplinary educational and professional programs (in the standards of the master's and doctor of philosophy);

- requirements of professional standards (if available);

3) the educational program includes:

- a list of educational components, and their logical sequence;

- requirements for the level of education of persons who can start studying under this program;

- the number of ECTS credits required to complete this program, as well as the expected learning outcomes (competencies) that the student of higher education must master;

4) the institution of higher education, based on the corresponding educational program, develops a curriculum that determines the list and volume of educational components in ECTS credits, their logical sequence, forms of organization of the educational process, types and volume of educational classes, schedule of the educational process, forms of current and final control, which ensure that the recipient of the corresponding degree of higher education achieves program learning outcomes. Individual study plans for each academic year are developed and approved for each student of higher education based on the curriculum in the order determined by the institution of higher education.

The educational and professional program "174 Automation, computer-integrated technologies and robotics" in the editorial office after revision:

1) developed as a temporary one until the adoption of the Higher Education Standard for the relevant level of higher education in the specialty "174 Automation, computer-integrated technologies, and robotics" by the working group of the

Department of Automation and Computer Telecontrol of Train Traffic of the Ukrainian State University of Railway Transport, consisting of:

- Vasyl SOTNYK – Head of the Department of Automation and Computer Telecontrol of Trains, Associate Professor, Candidate of Technical Sciences;
- Olha ANANIEVA – Professor of the Department of Automation and Computer Telecontrol of Trains, Doctor of Technical Sciences;
- Serhii ZMII – Dean of the Faculty of ICST, Associate Professor of the Department of Automation and Computer Telecontrol of Train Traffic, Candidate of Technical Sciences;
- Serhii KOSHEVYI – Associate professor of the department of automatics and computer remote control of Train traffic, Candidate of Technical Sciences.

Involving and considering the positions and needs of the following stakeholders:

- Vitaly SUSIDKO – Head of the department of development and implementation of new equipment of the Department of Automation and Telecommunications of the Joint-Stock Company "Ukrainian Railways".

2) approved at the meeting:

- Department of Automation and Computer Telecontrol of Trains from "____" _____ 2023 (protocol No. ____);
- of the Scientific and Methodological Commission of the Faculty of Information Management Systems and Technologies from "____" _____ 2023 (protocol No. ____);
- of the Academic Council of the Faculty of Information Management Systems and Technologies from "____" _____ 2023 (protocol No. ____);

3) approved at the meeting of the academic council of the Ukrainian State University of Railway Transport from "____" _____ 2023 (protocol No. ____).

2. Profile of the educational and professional program "Automation, computer-integrated technologies and robotics"

2.1 General characteristics	
Level of higher education	Second (master's) level.
Scientific Degree	Master
Branch of knowledge	17 Electronics, automation, and electronic communications.
Specialty	174 Automation, computer-integrated technologies, and robotics.
Forms of education	Full-time, part-time, dual.
Educational Qualification	Master's degree in automation, computer-integrated technologies and robotics.
Diploma qualification	Degree (level) of higher education – Master's. Specialty – 174 Automation, computer-integrated technologies, and robotics. Educational and professional program – Automation, computer-integrated technologies, and robotics.
The level of the National Qualifications Framework (NQF)	NQF of Ukraine level 7
Prerequisites	Possession of a bachelor's degree (or educational and qualification level of a specialist).
The language of instruction	Ukrainian
Validity of the educational program	Until the end of the study period or the next update of the program
2.2 Purpose of the educational program	
Training of specialists capable of professional activities in the complex solution of design, operation, restoration, and quality control of effective automation systems of complex technological objects and complexes based on modern means of automation, computer-integrated technologies, and robotics.	
2.3 Characteristics of the educational program	
Subject area (field of knowledge, specialty,	<i>Study objects of the educational program:</i> - management objects and processes (technological processes, production, organizational structures),

specialization (if available))	<p>technical, informational, mathematical, software, and organizational support of automation systems, computer-integrated technologies, and robotics in the field of transport, energy, industry, and other areas.</p> <p><i>Training goals:</i> training of engineers and scientists capable of comprehensively solving complex tasks and problems of creation, improvement, modernization, operation, and support (in particular maintenance and repair) of automation systems, their components, cyber-physical systems, digital transformation technologies behind tasks of Industry 4.0, contribute to the process of rapid adaptation of products and services of enterprises and companies, and also ensure the transition from the physical world to the digital one.</p> <p><i>The theoretical content of the subject area:</i> concepts and principles of the theory of automatic control, principles of developing automation systems of complex technological objects and complexes, computer-integrated technologies, and robotics for responsible production and technological activity areas.</p> <p><i>Methods, techniques and technologies.</i> Methods of analysis, synthesis, design, debugging, modernization, operation, and support of automation systems, computer-integrated technologies and robotics, cyber-physical productions; methodology of scientific research of control objects and automation systems of complex organizational and technical objects and technological processes</p> <p><i>Tools and equipment.</i> Digital and network technologies, microprocessors, programmable logic controllers (PLC), embedded digital devices and systems (Embedded Systems), intelligent mechatronic and WLAN-compatible components of the Internet of Things (IoT), specialized software for the design, development, and operation of automation systems (CAD and CAE systems).</p>
Orientation of the educational program	Educational and professional program of the second level of higher education - master's degree. The educational program is focused on the formation of a specialist capable of solving complex scientific and technical problems in the field of electronics, automation, and electronic communication, development, design, debugging, and operation of computerized and robotic systems.
The main focus of the educational program and specialization	General higher education of the second (master's) level in the field of electronics, automation, and electronic communication with the specialty 174 Automation, computer-integrated technologies, and robotics.
Features of the educational program	Acquisition and integration of knowledge from modern and promising directions in the field of electronics, automation, and electronic communication, development, design, debugging, and operation of computerized and robotic systems.

2.4 Graduates' employment and further education abilities	
Employment abilities	<p>A specialist can perform work from classification groups according to the DK 003:2010 profession classifier: Names of professions according to the National Classifier of Ukraine (Profession Classifier DK 003:2010):</p> <p>2131.2 Engineer of automated production control systems;</p> <p>2131.2 Research engineer in computerized systems and automation;</p> <p>2131.2 Designer of computer systems;</p> <p>2143.2 Dispatching and technological control engineer;</p> <p>2145.2 Engineer for mechanization and automation of production processes;</p> <p>2149.1 Researcher (transport)</p>
Academic abilities	The possibility of further study according to the program of the third (educational and scientific) level of higher education, as well as to acquire additional qualifications in the adult education system.
2.5 Teaching and assessment	
Teaching and learning	<p>The main methods of assessment in the educational program: a modular cumulative system based on the results of ongoing training, testing or oral/written exams, tests, reports on practices, coursework (projects), and final qualification work.</p> <p>Auditory current work is represented by lectures, practical classes, and laboratory work.</p> <p>Independent extracurricular work is represented by course projects and works, control works based on educational and methodological support of disciplines (textbooks, study aids, portal of distance learning courses, Internet resources, etc.), consultations with teachers, professional practice, and completion of final qualification work.</p>
Assessment	<p>Academic achievements of students are evaluated:</p> <ul style="list-style-type: none"> - according to the national scale – excellent, good, satisfactory, unsatisfactory, passed, not passed; - 100-point scale (60 points of current control, 40 points of modular control); - according to the ECTS scale (A, B, C, D, E, FX, F).
2.6 The number of ECTS credits required to complete the educational and professional program	

The educational and professional program contains 90 ECTS credits (1 credit – 30 academic hours). Practice is 6 ECTS credits. 35% of the volume of educational components of the educational and professional program is aimed at acquiring general and special (professional) competencies. The volume of subjects of the students' free choice is 25% of the total number of ECTS credits provided for in the educational program.

2.7 Program competencies, which must be mastered by the applicant of higher education

Integral competence	The ability to solve complex specialized tasks and problems of automation, computer-integrated technologies, and robotics, characterized by complexity and uncertainty of conditions, during professional activity and/or in the learning process, which involves the application of theories and methods in the field of electronics, automation, and electronic communication	
General competencies (GC)	GC 1	The ability to conduct research at an appropriate level.
	GC 2	The ability to generate new ideas (creativity).
	GC 3	The ability to abstract thinking, analysis, and synthesis.
	GC 4	The ability to work in an international context.
	GC 5	The ability to process scientific and technical information presented in a foreign language, as well as to present the results of one's own research in a foreign language.
	GC 6	The ability to make informed decisions
	GC 7	The ability to work both individually and in a team.
Special (professional, subject) competencies (SC)	SC1	The ability to automate complex technological objects and complexes, to create cyber-physical systems based on intelligent management methods and digital technologies using databases, knowledge bases, methods of artificial intelligence, robotics, and intelligent mechatronic devices.
	SC 2	The ability to design and implement highly reliable and safe automation systems and their application software, implement management and information processing functions, and protect intellectual property rights for new design and engineering solutions.
	SC 3	The ability to apply modeling and optimization methods to research and improve the efficiency of systems and processes of managing complex technological and organizational technical objects.
	SC 4	The ability to analyze production and technological systems and complexes as objects of automation, to determine methods and strategies for their automation and digital transformation.

	SC 5	The ability to integrate knowledge from other fields, apply a systematic approach and take into account non-technical aspects when solving engineering problems and conducting scientific research.
	SC 6	The ability to apply modern methods of the theory of automatic control for the development of automated control systems for technological processes and objects.
	SC 7	The ability to apply specialized software and digital technologies to solve complex tasks and problems of automation, computer-integrated technologies, and robotics.
	SC 8	The ability to develop the functional, technical, and information structure of computer-integrated management systems of organizational and technological complexes using network and information technologies, control hardware and software complexes, industrial controllers, mechatronic components, robotic devices, and human-machine interface tools.
	SC 9	The ability to develop and implement measures for the safety of labor and technological processes at responsible production and technological facilities, in particular in the field of transport, energy, and industry.
	SC 10	The ability to effectively organize production and technological processes in the field of electronics, automation, and electronic communication, including at high-risk infrastructure facilities, using advanced methods of equipment operation, maintenance, and repair.
	SC 11	The ability to develop and apply effective methods of technical control, diagnostics, and testing of software and hardware automation of technological processes at the stages of their production, operation, and repair.
	SC 12	The ability to develop, implement and use effective energy- and resource-saving technologies in process automation systems.
	SC 13	The ability to organize and perform work on certification of technical means of automation of technological processes in responsible areas of production.
	SC 14	The ability to be innovative in the field of automation and computer-integrated control of technological processes in various fields.
2.8. The normative content of the training of higher education applicants, formulated in terms of learning outcomes (LO)		

LO 01. Create automation systems, and cyber-physical production based on the use of intelligent management methods, databases and knowledge bases, digital and network technologies, and robotic and intelligent mechatronic devices.

LO 02. To create highly reliable and safe automation systems with a high level of functional and information security of software and technical means.

LO 03. Apply specialized conceptual knowledge, including modern scientific achievements, as well as a critical understanding of modern problems in the field of automation and computer-integrated technologies to solve complex problems of professional activity.

LO 04. Apply modern modeling and optimization approaches and methods for research and creation of effective SC automation systems with complex technological and organizational and technical objects.

LO 05. To develop computer-integrated management systems for SC-structural technological and organizational-technical objects, applying a systematic approach taking into account non-technical SC-structural evaluations of automation objects.

LO 06. Communicate freely in national and foreign languages orally and in writing to discuss professional problems and results of activities in the field of automation and computer-integrated technologies, presentation of research results, and innovative projects.

LO 07. Analyze production and technical systems in a certain field of activity as objects of automation and determine the strategy of their automation and digital transformation.

LO 08. Apply modern mathematical methods, methods of automatic control theory, reliability theory, and system analysis for research and creation of SC automation systems with complex technological and organizational-technical objects, and cyber-physical productions.

LO 09. Develop the functional, organizational, technical, and information structure of SC automation systems with complex technological and organizational and technical objects, develop software and technical control complexes using network and information technologies, industrial controllers, mechatronic components, robotic devices, human-machine interface tools, and taking into account technological conditions and requirements for production management.

LO 10. Develop and use specialized software and digital technologies to create automation systems with complex organizational and technical objects, and professionally use special software tools.

LO 11. Adhere to the norms of academic integrity, and know the basic legal norms regarding the protection of intellectual property, and commercialization of the results of research, invention, and design activities.

LO 12. Collect the necessary information using scientific and technical literature, databases, and other sources, analyze and evaluate it.

LO 13. Organize and control production and technological processes, ensure and ensure the work of personnel in the field of automation and computer-integrated technologies in various industries, in particular - in transport, energy, and industry.

<p>LO 14. To organize, conduct and perform work on technical control, diagnostics, and testing of modern automation systems and computer-integrated technologies for responsible areas of production, to properly draw up and submit methodical and reporting documentation on technical control and testing.</p> <p>LO 15. To introduce and apply modern energy-saving and resource-saving technologies in the processes of automation of technological processes in various spheres of production.</p> <p>LO 16. Organize and carry out work on the certification of responsible technical means of automation and computer-integrated technologies, to execute certification documentation.</p> <p>LO 17. Draw up and submit innovative proposals, and implement their results in production.</p> <p>The correspondence between learning outcomes and competencies is shown in Table 1, and the correspondence between learning outcomes and educational components is shown in Table 2.</p>	
<p>2.9 Resource support for the implementation of the educational and professional program</p>	
<p>Staff assistance</p>	<p>The implementation of the program is ensured by highly qualified personnel with scientific degrees and scientific titles who have extensive experience in educational, methodological, and scientific research work. Staffing complies with the Licensing conditions for conducting educational activities of educational institutions, approved by Resolution No. 1187 of the Cabinet of Ministers of Ukraine dated December 30, 2015.</p>
<p>Material and technical support</p>	<p>The requirements regarding the security of higher education applicants have been fully met:</p> <ul style="list-style-type: none"> - premises for conducting educational classes and control events; - multimedia equipment for simultaneous use in classrooms; - social and household infrastructure, dormitory; - laboratories, testing grounds, equipment, equipment, computer workplaces necessary for the implementation of educational plans. <p>Provision of social and household infrastructure, in particular:</p> <ul style="list-style-type: none"> - library (educational, scientific, artistic), including a reading room; - canteens and buffets; - assembly hall; - a stadium with a standard-sized football field, running tracks, open basketball and volleyball courts; - supported premises of the stadium with changing rooms and shower and sanitary facilities, gymnasium, tennis, chess, aerobics and fitness halls; - sports hall, powerlifting, wrestling, gymnastics halls.
<p>Informational and educational and</p>	<p><u>Information support.</u> The requirements for:</p> <ul style="list-style-type: none"> - provision of the library with domestic and foreign professional periodicals of a corresponding or related profile, including in electronic form;

methodological support	<p>-- availability of access to databases of periodical scientific publications in English of the relevant or related profile;</p> <p>- the presence of an official website of the educational institution, which contains basic information about its activities (structure, licenses and certificates of accreditation, educational/educational-scientific/publishing/attestation (scientific staff) activities, educational and scientific structural divisions and their structure, admission rules, contact information;</p> <p>-- availability of an electronic resource of the educational institution, which contains educational and methodical materials from the disciplines of the curriculum, including in the distance learning system.</p> <p><i>Educational and methodological support.</i> The requirements for the presence of:</p> <p>- description of the educational program, curriculum and explanatory notes to it, work program for each educational discipline of the curriculum;</p> <p>- a complex of educational and methodological support for each educational discipline of the curriculum;</p> <p>- end-to-end program of practical training, working programs of practices; methodical materials for certification of applicants. Students are provided with educational and teaching-methodical materials for each academic discipline of the curriculum.</p>
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2.10 Academic mobility

National credit mobility	Academic mobility of students on the territory of Ukraine is implemented in accordance with the resolution of the Cabinet of Ministers of Ukraine dated August 12, 2015 No. 579 "Regulations on the procedure for realizing the right to academic mobility". The transfer (enrollment) of educational credits obtained in other institutions of higher education is carried out.
International credit mobility	It is carried out on the basis of bilateral agreements between the Ukrainian State University of Railway Transport and higher education institutions of foreign partner countries.
Education of foreign students of higher education	<p>It is carried out on the basis of bilateral contracts (agreements) between the Ukrainian State University of Railway Transport and higher education institutions of foreign countries.</p> <p>The presence of an international relations department, a department for working with foreign students, and a dormitory at the university. The curriculum for foreign students of higher education provides for the study of the disciplines "Local Studies" and "Ukrainian (foreign) language".</p>

3. List of educational components (EC) and their logical sequence

№	Educational component	Number of ECTS credits	Study duration (in semesters)	Final control form
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1	2	3	4	5
1. GENERAL TRAINING CYCLE (mandatory components)				
EC 01	Personnel Management	3	1	test
EC 02	Business Foreign Language	4	2	test
EC 03	Technical and economic justification of projects	3	1	test
EC 04	Fundamentals of scientific research and copyright	3	1	test
EC 05	Energy- and resource-saving technologies	3	1	test
EC 06	Industrial safety in the field of automation and communication	3	1	test
The volume of normative educational components		22	-	-
Elective components of the general training cycle				
EC 01	Philosophical problems of scientific knowledge**	3	1	*
EC 02	Technical and economic substantiation of engineering solutions in intelligent production**	3	1	*
Volume of optional educational components		6	-	-
The total volume of educational components of the cycle		25	-	-
2. VOCATIONAL TRAINING CYCLE (mandatory components)				
MC 07	Infrastructural components of ensuring traffic safety on high-speed railways	4	1	test
1	2	3	4	5
MC 08	Innovative signal autoregulation systems and unmanned trains	5	1	exam
MC 09	Integrated information and control systems	5	1	exam
MC 10	Innovative remote control and control systems	5	1	exam
MC 11	Technologies for the development of train traffic control devices and systems	5	1	exam
MC 12	Diagnostics and testing of process automation systems	5	1	exam
MC 13	Theory of optimal automatic control systems	4	1	exam

MC 14	Mathematical methods and models of production processes	4	1	exam
MC 15	Programming of industrial controllers	4		exam
The volume of normative educational components		41	-	-
Selective components of the professional training cycle				
SC 03	High technologies and intelligent robots**	4	1	*
SC 04	Programming robot control devices**	4	1	*
SC 05	Means of communication of computerized systems**	4	1	*
SC 06	Cryptographic methods of information protection**	4	1	*
Volume of optional educational components		16	-	-
The total volume of educational components of the cycle		49	-	-
3. RESEARCH (SCIENTIFIC) COMPONENT				
EC 16	Practice	6	-	test
EC 17	Writing the graduation thesis	10	-	protection in DEC
The volume of research (scientific) components		16	-	-
The total scope of the educational and professional program		90	-	-
* – the form of final control is determined by the curriculum;				
** – the educational component is determined based on the results of students' selection in accordance with the established procedure.				

4. Structural and logical scheme of the educational program

The logical sequence of study of educational components is determined by their sequence according to the beginning of study (for educational components that are studied over several semesters, the beginning of study of educational components is determined by the first semester of their study). The educational components of the next stage cannot be studied before or simultaneously with the beginning of studying the educational components of the previous stage. Черговість вивчення освітніх компонент:

- 1) educational components of the first stage:
 - innovative signal autoregulation systems and unmanned trains;
 - basics of scientific research and copyright;
 - innovative remote control and control systems;

- 2) educational components of the second stage:
 - technologies for the development of train traffic control devices and systems;
 - programming of industrial controllers;
- 3) educational components of the third stage:
 - integrated information and management systems;
 - theory of optimal automatic control systems;
- 4) educational component of the fourth stage:
 - automated technologies for designing computerized and robotic systems;
 - diagnostics and testing of railway automation systems;
- 5) educational component of the fifth stage:
 - standardization and certification of train traffic support systems;
 - infrastructural components of ensuring traffic safety on high-speed railways;
 - economic justification of projects;
- 6) the order of study of other educational components is determined by the curriculum.

5. Forms of attestation of higher education applicants

Forms of attestation of applicants of higher education	Attestation is carried out in the form of a public defense of the final qualification work at the SEC, or through a state exam (by decision of the graduating department)
Requirements for graduation qualification work	The qualifying work must demonstrate the graduate's ability to solve complex tasks and problems of automation, computer-integrated technologies and robotics based on research and/or implementation of innovations under uncertain conditions and requirements. The qualification work must not contain academic plagiarism, fabrication, or falsification. The qualification work must be published on the official website of the institution of higher education or its division, or in the repository of the institution of higher education.

6. Requirements for the existence of a system of internal quality assurance of higher education

The Ukrainian State University of Railway Transport operates a quality assurance system for educational activities and the quality of higher education (internal quality assurance system), which provides for the provision of measures and implementation of the following procedures:

- 1) determination of the principles and procedures for ensuring the quality of higher education;
- 2) monitoring and periodic review of educational programs;

3) annual assessment of applicants for higher education, scientific and pedagogical staff of the institution of higher education and regular publication of the results of such assessments on the official website of the institution of higher education, on information stands and in any other way;

4) improving the qualifications of pedagogical, scientific and scientific-pedagogical workers;

5) availability of the necessary resources for the organization of the educational process according to the educational program, including independent work of students;

6) ensuring the availability of information systems for effective management of the educational process;

7) publicity of information about the educational program, degree of higher education and qualifications;

8) an effective system of prevention and detection of academic plagiarism in scientific works of employees and students of higher education.

7. Requirements of professional standards

Missing.

8. List of normative documents on which the educational program is based

The educational program is based on the following regulatory documents:

1. Довідник кваліфікаційних характеристик професій працівників. Галузеві випуски.
2. Європейська кредитна трансферно-накопичувальна система: довідник користувача / пер. з англ.; за ред. Ю.М. Рашкевича та Ж.В. Таланової. – Львів: видавництво Львівської політехніки, 2015. – 106 с.
3. Закон України «Про вищу освіту» від 01.07.2014 р. № 1556-VII // Відомості Верховної Ради. – 2014. – № 37, 38.
4. Національна рамка кваліфікацій. Додаток до постанови Кабінету Міністрів України від 23 листопада 2011 р. № 1341.
5. Національний класифікатор України: «Класифікатор професій» ДК 003:2010, затверджений наказом Держспоживстандарту від 28.07.2010 р. № 327 зі змінами, затвердженими наказом Міністерства економічного розвитку і торгівлі України від 16.08.2012 р. № 923.
6. Перелік галузей знань і спеціальностей – <http://zakon4.rada.gov.ua/laws/show/266-2015-п>.
7. Постанова Кабінету Міністрів України від 26.04.2015 р. № 1341 «Перелік галузей знань і спеціальностей, за якими здійснюється підготовка здобувачів вищої освіти».
8. Стандарти і рекомендації щодо забезпечення якості в Європейському просторі вищої освіти. – К.: Ленвіт, 2006. – 35 с.
9. Структури ключових компетенцій, які розглядаються як необхідні для всіх у суспільстві, заснованому на знаннях (Key Competences for Lifelong learning: A European Reference Framework – IMPLEMENTATION OF "EDUCATION AND

TRAINING 2010", Work programme, Working Group B "Key Competences", 2004.

10. ESG – http://ihed.org.ua/images/pdf/standards-and-guidelines_for_qa_in_the_ehea_2015.pdf.

11. ISCED (MCKO) 2011 – <http://www.uis.unesco.org/education/documents/isced-2011-en.pdf>.

ISCED-F (MCKO-Г) 2013 –
<http://www.uis.unesco.org/Education/Documents/isced-fields-of-education-training-2013.pdf>.

**Explanatory note
to the educational and professional program of higher education of Ukraine
"Automation, computer-integrated technologies and robotics"**

Code and name of specialty: 174 Automation, computer-integrated technologies and robotics.

Level of higher education: second (educational and professional).

Degree of higher education: master's degree.

Form of education: full-time, part-time.

The total number of credits of the European Credit Transfer and Accumulation System and the duration of study: 90 ECTS credits, 1 year 4 months.

Requirements for the level of education of persons who can start training: the presence of a bachelor's degree (or the educational and qualification level of a specialist).

The list of academic disciplines and the type of control over the master's training cycles of specialty 174 Automation, computer-integrated technologies and robotics: are given in the curriculum.

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