MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE NATIONAL TECHNICAL UNIVERSITY OF UKRAINE "Igor Sikorsky Kyiv Polytechnic Institute"

APPROVED BY

Academic Council of Igor Sikorsky Kyiv Polytechnic Institute (Prot. № 3 from 15.03.2021) Head of the Academic Council Mykhailo ILCHENKO

Electronic systems of multimedia and Internet of Things technology

EDUCATIONAL PROFESSIONAL PROGRAM

first (bachelor's) level of higher education

in specialty 171 "Electronics"

field of knowledge 17 "Electronics and telecommunications"

qualification Bachelor's degree in Electronics

Entered into force from 2021/2022 academic year by order of the rector Igor Sikorsky Kyiv Polytechnic Institute from 19.04.2021, № HOH/89/2021

PREFACE

DEVELOPED by the project group:

Project team leader:

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Project team members:

Volodymyr Semenovych Lazebnyi, Ph.D., Docent, Associate Professor of the Department of Acoustic and Multimedia Electronic Systems

Popovych Pavlo Vasylovych, Ph.D., Docent, Associate Professor of the Department of Acoustic and Multimedia Electronic Systems

Smolenska Oleksandra Ihorivna, graduate student of the Department of Acoustic and Multimedia Electronic Systems

The Department of Acoustic and Multimedia Electronic Systems is responsible for the preparation of higher education applicants under this educational program

AGREED:

Scientific and Methodological Commission of the University, specialty 171 Electronics

Head of the SMCU 171 Yulia YAMNENKO

(Prot. № 4 from 02.02. 2021)

Methodical Council of Igor Sikorsky KPI.

Head of the Methodical Council Yurii YAKYMENKO

(Prot. № 6 from 25.02. 2021)

Proposals of interested persons are taken into account:

• increase the diversity of professionally-oriented disciplines (students) and maintain a rich fundamental component (employers).

The following changes have been made in the educational program:

• part of the disciplines was transferred to the blocks of elective disciplines, their content was modernized according to the profile 171 Electronics, an expanded list of disciplines was proposed to the cathedral F-Catalog.

• recommendations on updating educational programs and features of developing curricula for bachelors (taking into account the order of KPI named after Igor Sikorsky from $30.11.2020 \ N_{\odot} \ HOH/35/2020$ "On improving educational programs of the first (bachelor's) level of higher education") and amended accordingly list of compulsory and optional educational components.

Coordinated with members of the scientific-methodical commission and the support group of the specialty 171 Electronics KPI them. Igor Sikorsky.

The educational program was considered at the meeting of the Department of Acoustic and Multimedia Electronic Systems., Protocol № 8 of January 20, 2021.

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	educational program	15
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	of the educational program	16

	1 – General Information										
Full name of the higher	National Technical University of Ukraine " Igor Sikorsky Kyiv										
education institution and	Polytechnic Institute",										
institute / faculty	Faculty of Electronics										
Degree of higher	Degree - bachelor										
education and title of	Educational qualification - Bachelor of Electronics										
qualification in the											
original language											
The official title of the	Electronic systems of multimedia and Internet of Things technology										
educational program	Electronic systems of multimedia and internet of Things technology										
Type of diploma and	Bachelor's degree, single, 240 credits,										
scope of educational	term of study 3 years 10 months										
program											
Availability of	Certificate of accreditation of the specialty НД 1192560, valid until										
accreditation	01.07.2023										
Cycle / level of higher	National Qualifications Framework of Ukraine - 6 level										
education	QF-EHEA – the first cycle										
	EQF-LLL - 6 level										
Prerequisites	- on the basis of complete general secondary education \Box 240 ECTS										
	credits;										
	- on the basis of the degree "junior bachelor" (educational qualification										
	level "junior specialist") it is possible to recalculate ECTS credits										
	received within the previous educational program of junior bachelos										
	(junior specialist): for specialties 17 "Electronics and										
	Telecommunications" no more than 120 ECTS credits; in other										
	specialties no more than 60 ECTS credits.										
Language (s) of	Ukrainian										
instruction											
Term of the educational	Until the next review										
program											
Internet address of the	https://osvita.kpi.ua/op										
permanent placement of	http://fel.kpi.ua/fel/index.php?option=com_content&view=article&id=//										
the educational program	<u>/&Itemid=104⟨=uk</u>										
	2 - The Purpose of the Educational Program										
Formation of theoretical	and practical knowledge and skills, ways of thinking, views, values and										
other personal qualities	in an electronics specialist, sufficient to solve complex specialized										
theoretical and practica	I tasks of development, design, production, installation, operation,										
maintenance, repair and r	nodernization electronic devices and systems, as well as the formation of										
high adaptability of high	er education seekers in the case of transformation of the labor market										
through interaction with	\mathbf{L} employers and other stakenoiders. The purpose of the educational										
program corresponds to 1	ine development strategy of Igor Sikorsky Kyiv Polytechnic Institute for										
2020-2025 on the format	ion of the society of the future on the basis of the concept of sustainable										
development.											

1. Profile of the Educational Program in the Specialty 171 Electronics

3 - Characteristics of the Educational Program											
Subject area (field of knowledge, specialty, specialization (if available))	<i>Objects of study and activity of electronics specialists</i> are hardware and software of electronics, microprocessor and microcontroller devices, devices and systems of power electronics and converting equipment, primary and secondary system transformations of information, analog and digital components, processes and systems of collection, storage, protection, processing, transmission of information and integration of these systems for automation of engineering tasks on the basis of modern computer equipment and software										
	<i>The purpose of training</i> is to acquire theoretical and practical knowledge and skills, abilities, ways of thinking, views, values and other personal qualities sufficient to solve complex specialized theoretical and practical tasks of development, design, production, installation, operation, maintenance, repair and modernization of electronic devices and systems.										
	<i>The theoretical content of the subject area</i> is formed by the concepts and principles of electrical engineering, physical foundations of electronics, information theory, signal processing, computer- integrated technologies. <i>The graduate learns to apply and use</i> computer and microprocessor technology, measuring equipment, devices and systems of conversion technology, acoustoelectronics and power electronics, industrial controllers, other technical means of electronic devices and systems.										
Orientation of the educational program	Educational-professional										
The main focus of the educational program and specialization	General higher education in the field of electronics, in particular, its physical foundations, materials and technologies, electronic means of multimedia systems and the Internet of Things, analog and digital circuitry, converter and microprocessor technology, mastering additional fundamental and vocational disciplines, which together provides the necessary competencies for further professional activity. Aimed at developing the applicant's ability to identify and solve complex problems in the field of knowledge 17 Electronics and telecommunications within the specialty 171 Electronics. The program gives students the opportunity to freely choose disciplines according to the profile of the department. Keywords : Electronic multimedia systems; Electronic means of the Internet of Things, Microprocessor systems, Electronic means of										

	The internship must be at least 4 ECTS credits.
	The program is based on the requirements of the European
	Qualifications Framework for Lifelong Learning (EQF-LLL).
	The possibility of obtaining higher education in dual form.
	Participation of students in certificate programs.
	Students gain special knowledge in the field of modern electronic
Features of the program	multimedia systems digital cinema hardware and software of digital
Touries of the program	television and technologies for creating and distributing audio-visual
	content hardware and software of the Internet of Things and can work
	at Illrainian enterprises in the relevant profile. To implement the
	at Oktainian enterprises in the relevant prome. To imprement the program it is planned to involve specialists and experts in the speciality
	171 Electronics and related specialities as well as representatives of
	1/1 Electronics and relative specialities, as well as representatives of
1 Suital	employers and other stakenolders.
4 - Suitar	Soluty of Graduates for Employment and Further Study
Suitability for	Recommended professional titles of works according to the current
employment	edition of the National Classifier of Ukraine: Classifier of professions
	(DK 003: 2010):
	3114 Technicians in the field of electronics and telecommunications:
	- telecommunication technician;
	- radar technician;
	- design technician;
	- technician-technologist (electronics);
	2110 Other technical specialists in the field of physical sciences and technology
	- dispatcher for the collection of navigation information:
	- laboratory assistant (electronics);
	- technician for preparation of technical documentation (electronics);
	- specialist in technical expertise (electronics).
	3123 Controllers and regulators of industrial robots:
	- debugging and testing technicians;
	- robot controller.
	3131 Photographers and operators of image and sound recording equipment:
	- video operator;
	- sound recording operator;
	- editor.
	3132 Operators of radio and telecommunication equipment
	- radio electronics;
	- sound recording technician.
	3139 Other operators of optical and electronic equipment:
	- technicians for diagnostic equipment;
	- Technician-technologist for the production of ontical and optoelectronic devices
	3111 Laboratories and techniques related to chemical and physical research
	3439 Other technicians in management:
Eventh on tuninin a	- specialist in the organization of operation and repair (electronics)
Further training	The right to continue education at the second (masters) level of higher
	education. Acquisition of additional qualifications in the system of
	5 - Leaching and Assessment
Teaching and studying	Lectures, practical and seminar classes, computer workshops and
	laboratory works; course projects and works; technology of blended
	learning, practice and excursions; performance of qualification work

Evoluction	Comment control in the forms of laboratory reports, presentations, written
Evaluation	Current control in the form of laboratory reports, presentations, written
	modular tests. Semester control in the form of written and oral
	examinations and defense of qualification work. Assessment of
	students' knowledge is provided in accordance with the Regulations on
	the system of assessment of learning outcomes in Igor Sikorsky KPI for
	all types of classroom and extracurricular work (current, calendar,
	semester control); oral and written exams, tests.
	6 - Program Competencies
Integral competence	Ability to solve complex specialized problems and practical problems,
	characterized by complexity and uncertainty of conditions, during
	professional activities in the field of electronics, or in the learning
	process, which involves the application of theories and methods of
	electronics.
	General Competences (GC)
GC 1. Ability to apply kn	owledge in practical situations.
GC 2. Knowledge and	understanding of the subject area and understanding of professional
activity.	
GC 3. Ability to commun	icate in the state language both orally and in writing
GC 4. Ability to commun	icate in a foreign language.
GC 5. Skills in the use of	information and communication technologies.
GC 6. Ability to learn and	l master modern knowledge.
GC 7. Ability to search, p	process and analyze information from various sources.
GC 8. Interpersonal skills	5
GC 9. Ability to work in	a team.
GC 10. Implementation o	f safe activities.
GC 11. Ability to evaluat	e and ensure the quality of work performed.
GC 12. Definiteness and	perseverance in terms of tasks and responsibilities.
GC 13. The ability to exe	ercise their rights and responsibilities as a member of society, to realize
the values of civil (free d	emocratic) society and the need for its sustainable development, the rule
of law, human and civil r	ights and freedoms in Ukraine.
GC 14. Ability to preser	ve and multiply moral, cultural, scientific values and achievements of
society based on underst	anding the history and patterns of development of the subject area, its
place in the general syst	em of knowledge about nature and society and in the development of
society, techniques and te	chnologies. active recreation and leading a healthy lifestyle.
Sp	ecial (professional, subject) Competencies (SC)
SC1. Ability to use know	ledge and understanding of scientific facts, concepts, theories, principles
and methods for the desig	in and application of devices, devices and systems of electronics.
SC2. Ability to analyse	of the subject area and regulatory documentation required for the design
and application of device	s, devices and electronics systems.
SC3. Ability to integra	te knowledge of fundamental sections of physics and chemistry to
understand the processes	of solid-state, functional and power electronics, electrical engineering.
SC4. Ability to take in	to account social, environmental, ethical, economic and commercial
considerations that affect	t the efficiency and results of engineering activities in the field of
electronics.	
SC5. Ability to apply	appropriate mathematical, scientific and technical methods, modern
information technology	and computer software, skills in working with computer networks,
databases and Internet res	sources to solve engineering problems in the field of electronics.
SC6. Ability to identify.	classify, evaluate and describe processes in electronics devices, devices
and systems using analyti	cal methods, modeling tools, prototypes and experimental results.
SC7. Ability to apply cre	ative and innovative potential for the synthesis of engineering solutions
and design of devices and	l electronics systems.

SC8. Ability to solve engineering problems in the field of electronics taking into account all aspects of development, design, production, operation and modernization of electronic devices, devices and systems.

SC9. Ability to determine and evaluate the characteristics and parameters of materials of electronic equipment, analog and digital electronic devices for the design of microprocessor and electronic systems.

SC10. Ability to apply in practice industry standards and quality standards of functioning of devices and systems of electronics.

SC11. Ability to monitor and diagnose the condition of equipment, use modern electronic components and hardware, perform maintenance, repair and maintenance of electronic devices and systems, install, configure and repair analog, digital and optical modules, develop and manufacture printed circuit boards, develop software for microcontrollers.

SC12. Ability to develop technical and design documentation for electronic devices and devices of multimedia systems and the Internet of Things in accordance with industry regulations.

SC13. Ability to apply knowledge of technological aspects of production, the latest electronic means, information and communication technologies in the field of electronic multimedia systems and the Internet of Things.

SC14. Ability to protect information and configure telecommunication channels for the transmission of audiovisual information flows in electronic multimedia systems and signal exchange devices of the Internet of Things.

	7 - Program Learning Outcomes
	Describe the principle of operation using scientific concepts, theories and methods
O1	and verify the results in the design and application of devices, devices and systems of
	electronics.
O2	Apply knowledge and understanding of differential and integral calculus, algebra,
	functional analysis of real and complex variables, vectors and matrices, vector
	calculus, differential equations in ordinary and partial derivatives, Fourier series,
	statistical analysis, information theory, numerical methods to solve theoretical and
	applied tasks of electronics.
O3	Find solutions to practical problems of electronics by applying appropriate models
	and theories of electrodynamics, analytical mechanics, electromagnetism, statistical
	physics, solid state physics.
O4	Evaluate the characteristics and parameters of electronic materials, understand the
	basics of solid-state electronics, electrical engineering, analog and digital circuitry,
	converter and microprocessor technology.
05	Use information and communication technologies, applied and specialized programs
	to solve problems of design and debugging of electronic systems, demonstrate skills
	of programming, analysis and display of measurement and control results.
06	Apply experimental skills (knowledge of experimental methods and experiments) to
	test hypotheses and study the phenomena of electronics, be able to use standard
07	equipment, plan, make diagrams; analyze, model and critically evaluate the results.
0/	Analyze complex digital and analog information and measurement systems with
	advanced architecture of computer and telecommunication networks, taking into
	account the specification of selected technical means of electronics and relevant
08	Identify and identify mathematical models of technological chicate during the
08	development of new complex electronic systems in the computer environment and the
	choice of the optimal solution
	Design complex real time systems and means of collecting and processing
09	information consistent with the specified information and software by using software
07	for embedded microcontroller systems
	for embedded merocontroller systems.

O10	Develop technical means for the construction and diagnosis of technical condition of electronic devices and systems, organize and conduct scheduled and unscheduled repairs, adjustment and reconfiguration of electronic equipment in accordance with current production requirements.
O11	Argue the legal framework for the implementation of electronic devices and systems; evaluate the benefits of engineering developments, their environmental friendliness and safety; to defend their own worldviews and beliefs in production or social activities.
012	Use documentation related to professional activities, using modern technologies and office equipment; use English, including special terminology, to communicate with specialists, conduct literary research and read texts on technical and professional topics.
013	Be able to learn new knowledge, advanced technologies and innovations, find new non-standard solutions and means of their implementation; meet the requirements of flexibility in overcoming obstacles and achieving goals, rational use and regulation of time, discipline, responsibility for their decisions and activities.
014	Adhere to the norms of modern Ukrainian business and professional language.
015	Demonstrate skills of independent and collective work, leadership qualities, organize work in a limited time with an emphasis on professional integrity.
O16	Apply understanding of the theory of stochastic processes, methods of statistical processing and data analysis in solving professional problems.
017	Demonstrate skills of experimental research related to professional activities; to improve measurement methods; control the reliability of the obtained results; to systematize and analyze the data obtained experimentally.
O18	Apply methods of mathematical modeling and optimization of electronic systems for the development of automated and robotic production systems.
019	Develop technical and design documentation for electronic devices and devices of multimedia systems and Internet of Things in accordance with industry regulations.
O 20	Apply knowledge of technological aspects of production, the latest electronic means, information and communication technologies in the field of electronic multimedia systems and the Internet of Things.
O 21	Protect information and configure telecommunication channels for the transmission of audiovisual information flows in electronic multimedia systems and the exchange of signals of Internet of Things devices.

8 - Resource Support for Program Implementation												
	In accordance with the personnel requirements for ensuring the											
Staffing	implementation of educational activities for the relevant level of HE,											
	approved by the Resolution of the Cabinet of Ministers of Ukraine											
	dated 30.12.2015 № 1187 as amended in accordance with the											
	Resolution of the Cabinet of Ministers of Ukraine №347 dated											
	10.05.2018.											
	In accordance with the technological requirements for material and											
Logistics	technical support of educational activities of the relevant level of HE,											
	approved by the Resolution of the Cabinet of Ministers of Ukraine											
	dated 30.12.2015 № 1187 as amended in accordance with the											
	Resolution of the Cabinet of Ministers of Ukraine № 347 dated											
	10.05.2018.											
	Use of equipment for lectures in the format of presentations, network											
	technologies, in particular on the distance learning platform Sikorsky,											
	demonstration industry equipment during laboratory workshops.											

Information and	In accordance with the technological requirements for educational and								
educational and	methodological and informational support of educational activities of								
methodical support	the relevant level of HE (Annex 5 to the License Conditions), approved								
	by the Resolution of the Cabinet of Ministers of Ukraine dated								
	30.12.2015 № 1187 as amended in accordance with the Resolution of								
	the Cabinet of Ministers of Ukraine № 347 from 10.05.2018								
	Use of the Scientific and Technical Library of Igor Sikorsky Kyiv								
	Polytechnic Institute								
	9 - Academic Mobility								
National credit mobility	Possible subject to the conclusion of relevant agreements on national								
	mobility and double diplomacy								
International credit	Possible subject to the conclusion of relevant agreements								
mobility									
Training of foreign	Studying in general groups of Ukrainian students or in separate groups								
applicants for higher	with teaching disciplines in English with the study of Ukrainian as a								
education	foreign language.								

control disciplines, practices, qualification work) credits control 1 2 3 4 I. REGULATORY Educational Components I.1. General Training Cycle GC1 Ukrainian for Specific Purposes 2 Final tests GC2 History of Science and Technology 2 Final tests GC3 Basics of a Healthy Lifestyle 3 Final tests GC4 Foreign Language for Professional Purposes 6 Exam GC5 Foreign Language for Professional Purposes 6 Exam GC6 Environmental Safety of Engineering Activity 2 Final tests GC7 Introduction to Philosophy 2 Final tests GC7 Economics and Production Organization 4 Final tests GC10 Labor Safety and Civil Protection 4 Final tests GC11 Mathematical Analysis 17,5 Exam GC12 Analytic Geometry 4,5 Exam GC13 Physica 5 Final tests <	Code n / a	Components of the educational program (academic	Number of	Form of final
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GC9Economics and Production Organization4Final testsGC10Labor Safety and Civil Protection4Final testsGC11Mathematical Analysis17,5ExamGC12Analytic Geometry4,5ExamGC13Physics12ExamGC14Engineering and Computer Graphics6ExamGC15Informatics8Final testsI.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits and Signals of Multimedia Devices4,5ExamVC6Electrical Circuits and Signals of 1Final testsVC7Coursework in Electric Circuits and Signals of 1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC13Course Project on Technical Means of Cinematography5ExamVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests <td>GC8</td> <td>Business Law</td> <td>2</td> <td>Final tests</td>	GC8	Business Law	2	Final tests
GC10Labor Safety and Civil Protection4Final testsGC11Mathematical Analysis17,5ExamGC12Analytic Geometry4,5ExamGC13Physics12ExamGC14Engineering and Computer Graphics6ExamGC15Informatics8Final testsI.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4VC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography1,5Final testsVC13Course Project on Technology and Coding5,5ExamVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final tests	GC9	Economics and Production Organization	4	Final tests
GC11Mathematical Analysis17,5ExamGC12Analytic Geometry4,5ExamGC13Physics12ExamGC14Engineering and Computer Graphics6ExamGC15Informatics8Final testsI.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4VC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	GC10	Labor Safety and Civil Protection	4	Final tests
GC12Analytic Geometry4,5ExamGC13Physics12ExamGC14Engineering and Computer Graphics6ExamGC15Informatics8Final testsI.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC13Course Project on Technical Means of Cinematography5ExamVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final tests	GC11	Mathematical Analysis	17,5	Exam
GC13Physics12ExamGC14Engineering and Computer Graphics6ExamGC15Informatics8Final testsI.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1ExamVC9Circuitry6,5ExamVC9Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC13Course Project on Technical Means of Cinematography5ExamVC14Fundamentals of Information Theory and Coding5,5ExamVC13Fundamentals of Radio and Television Broadcasting Systems4,5Final tests	GC12	Analytic Geometry	4,5	Exam
GC14Engineering and Computer Graphics6ExamGC15Informatics8Final tests1.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Circuitry6,5ExamVC9Circuitry of Multimedia Devices6ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC13Course Project on Technical Means of Cinematography5ExamVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	GC13	Physics	12	Exam
GC15Informatics8Final tests1.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	GC14	Engineering and Computer Graphics	6	Exam
1.2. Cycle of Professional TrainingVC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	GC15	Informatics	8	Final tests
VC1Measuring Technique3,5Final testsVC2Fundamentals of Analytical Mechanics and Theory of Oscillations4Final testsVC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1ExamVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC13Course Project on Technical Means of Cinematography5ExamVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests		1.2. Cycle of Professional Training		
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VC2Oscillations4VC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC2	Fundamentals of Analytical Mechanics and Theory of	4	Final tests
VC3Physical Fundamentals of Electronics4ExamVC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC2	Oscillations	4	
VC4Data Transmission Networks4,5Final testsVC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final tests	VC3	Physical Fundamentals of Electronics	4	Exam
VC5Theory of Electrical Circuits4Final testsVC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding Systems5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC4	Data Transmission Networks	4,5	Final tests
VC6Electrical Circuits and Signals of Multimedia Devices4,5ExamVC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC5	Theory of Electrical Circuits	4	Final tests
VC7Coursework in Electric Circuits and Signals of Multimedia Devices1Final testsVC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final tests	VC6	Electrical Circuits and Signals of Multimedia Devices	4,5	Exam
VC8Fundamentals of Probabilistic Data Processing5ExamVC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC7	Coursework in Electric Circuits and Signals of Multimedia Devices	1	Final tests
VC9Circuitry6,5ExamVC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC8	Fundamentals of Probabilistic Data Processing	5	Exam
VC10Digital Circuitry of Multimedia Devices6ExamVC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC9	Circuitry	6.5	Exam
VC11Design and Production Technology of Information Registration Equipment5ExamVC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC10	Digital Circuitry of Multimedia Devices	6	Exam
Registration Equipment5VC12Technical Means of Cinematography5VC13Course Project on Technical Means of Cinematography1,5VC14Fundamentals of Information Theory and Coding5,5VC15Fundamentals of Radio and Television Broadcasting Systems4,5VC16Introduction to the Internet of Things4	VC11	Design and Production Technology of Information	5	Exam
VC12Technical Means of Cinematography5ExamVC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests		Registration Equipment	-	
VC13Course Project on Technical Means of Cinematography1,5Final testsVC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC12	Technical Means of Cinematography	5	Exam
VC14Fundamentals of Information Theory and Coding5,5ExamVC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC13	Course Project on Technical Means of Cinematography	1,5	Final tests
VC15Fundamentals of Radio and Television Broadcasting Systems4,5Final testsVC16Introduction to the Internet of Things4Final tests	VC14	Fundamentals of Information Theory and Coding	5,5	Exam
VC16 Introduction to the Internet of Things 4 Final tests	VC15	Fundamentals of Radio and Television Broadcasting Systems	4,5	Final tests
	VC16	Introduction to the Internet of Things	4	Final tests

2. List of Components of the Educational Program

Code n/a	Components of the educational program (academic	Number of	Form of final								
	disciplines, practices, qualification work)	credits	control								
1	2	3	4								
VC17	Technical Electrodynamics and Propagation of Radio Waves	4	Exam								
VC18	Coursework in Technical Electrodynamics and Propagation of Radio Waves	1	Final tests								
VC19	Wireless Audiovisual Content Distribution Networks	3,5	Exam								
VC20	Coursework in Wireless Audiovisual Content Distribution Networks	1	Final tests								
VC21	Microprocessors and Microcontrollers in Information systems	4,5	Exam								
VC22	Power Supply and Electromagnetic Compatibility of Multimedia Equipment	4,5	Exam								
VC23	Pre-diploma Practice	6	Final tests								
VC24	Diploma Project	6	Defense								
	2. SELECTIVE Educational Compone	ents									
2.1. General Training Cycle (Selective educational components from the general University Catalog)											
GO1	Educational components 1 University catalogue	2	Final tests								
GO2	Educational components 2 University catalogue	2	Final tests								
	2.2. Vocational Training Cycle (Optional subjects from	Faculty cata	llogue)								
VO1	Educational components 1 Faculty catalogue*	4	Final tests								
VO2	Educational components 2 Faculty catalogue*	4	Final tests								
VO3	Educational components 3 Faculty catalogue*	4	Final tests								
VO4	Educational components 4 Faculty catalogue*	4	Final tests								
VO5	Educational components 5 Faculty catalogue*	4	Final tests								
VO6	Educational components 6 Faculty catalogue*	4	Final tests								
VO7	Educational components 7 Faculty catalogue*	4	Final tests								
VO8	Educational components 8 Faculty catalogue*	4	Final tests								
VO9	Educational components 9 Faculty catalogue*	4	Final tests								
VO10	Educational components 10 Faculty catalogue	4	Final tests								
V011	Educational components 11 Faculty catalogue	4	Final tests								
VO12	Educational components 12 Faculty catalogue*	4	Final tests								
VO13	Educational components 13 Faculty catalogue*	4	Final tests								
VO14	Educational components 14 Faculty catalogue*	4	Final tests								
	The total amount of normative educational components:		180								
	The total amount of selective educational components:		60								
The scope	of educational components that ensure the acquisition of		120								
	competencies defined by the SVO:		140								
ΤΟΤΑ	L VOLUME OF THE EDUCATIONAL PROGRAM		240								

* SVO = Standard of higher education of Ukraine

3. Form of Certification of Applicants for higher education

Certification of applicants for higher education according to the educational program takes place in the form of public defense of the qualification work in the form of a diploma project or diploma work. Based on the results of successful defense of the qualification work, the applicant receives a standard document on the award of a bachelor's degree and a bachelor's degree in electronics under the educational program "Electronic multimedia systems and the Internet of Things."

Certification should be open and public. Qualification work is checked for borrowings (plagiarism). Qualification work is published before the defense on the official website of the university, its department or in the university depository. Publication of qualification works containing information with limited access must be carried out in accordance with the requirements of current legislation.



4. Structural and Logical Scheme of the Educational Program

5. MATRIX OF CORRESPONDENCE OF PROGRAM COMPETENCIES TO THE COMPONENTS OF THE EDUCATIONAL PROGRAM

	3C 1	3C 2	3C 3	3C 4	3C 5	3C 6	3C 7	GC 8	3C 9	GC 10	GC 11	GC 12	GC 13	GC 14	GC 15	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	7C 10	7C 11	7C 12	⁷ C 13	7C 14	7C 15	C 16	C 17	C 18	7C 19	⁷ C 20	/C21	/C22	/C23	/C24
0.01	<u> </u>	•)					Ŭ	0	0	0	0	0	0	-	-				-	-	-		1	>	1	>	1	•	V	V	V	V		-			-
GCI	+			+	+										+				+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC 2						+									+			+	+		+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC 3	+																																				 '		µ
GC 4				+	+																																		L
GC 5														+	+	+	+		+															+	+			+	+
GC 6		+														+		+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC 7															+		+				+							+	+		+		+		+				+
GC 8	+			+	+																		+					+					+		+			+	
GC 9	+		+																				+															+	
GC10										+								+																				+	
GC11									+	+								+																					
GC12			+				+																					+					+		+			+	+
GC13								+												+			+																
GC14			+				+											+		+			+																
SC1															+	+	+				+	+				+			+							+		+	+
SC2																+	+				+	+				+	+			+	+	+					+		+
SC3													+			+					+	+				+	+				+						+		
SC4						+			+									+																					
SC5											+	+				+	+		+		+	+					+		+										+
SC6															+	+					+	+		+	+						+					+			+
SC7																	+					+				+		+					+		+				
SC8															+		+	+								+					+	+	+			+			
SC9																+	+							+	+	+										+			
SC10									+	+								+						+	+		+			+							+	+	
SC11																	+							+	+	+									+	+	+		
SC12						1	1	1	1	1	l														+		+	+		+	+					+			
SC13										+																					+			+					+
SC14																										+	+		+		+								

6. MATRIX OF PROVIDING PROGRAM LEARNING OUTCOMES WITH RELEVANT COMPONENTS OF THE EDUCATIONAL PROGRAM

	GC 1	GC 2	GC 3	GC 4	GC 5	GC 6	GC 7	GC 8	GC 9	3C 10	3C 11	GC 12	GC13	GC14	GC15	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	VC 10	VC 11	VC 12	VC 13	VC 14	VC 15	VC 16	VC 17	VC 18	VC19	VC 20	VC 21	VC 22	VC 23	VC 24
01										-	-	-	+	•	-						+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-			-
02											+	+						+			+	+				+			+		+	+	+	+	+	+	+		
03													+													+					+	+	+	+	+	+	+		+
O 4																	+	+	+				+	+	+	+							+	+					+
O 5														+	+			+		+		+		+	+														
O 6																	+				+	+		+	+						+	+	+			+	+	+	
O 7														+		+	+										+	+		+								+	+
O 8											+				+		+												+										
09																+	+		+																				
O 10									+	+						+	+									+					+	+				+			
O 11	+	+	+	+	+			+																														+	+
O 12	+								+	+						+	+											+		+			+	+					+
O 13							+									+	+											+					+						+
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