Ministry of Education and Science of Ukraine
Khmelnytskyi National University

APPROVED
by the Academic Board of
Khmelnytskyi National University
Record № 10 of 25.02.2021

Head of the Academic Board
_____ M. YE. SKYBA
Signature Initials, surname

EDUCATIONAL AND PROFESSIONAL

Type of the educational program

COMPUTER ENGINEERING AND PROGRAMMING

Name of the educational program

HIGHER EDUCATION LEVEL	**first (Bachelor's)**
MAJOR	**123 «Computer Engineering»** Code and name
FIELD OF STUDY	**12 «Information Technology»** Name code and name
QUALIFICATION	**Bachelor of Computer Engineering** Name

The educational program is put into force
from 1. 09 2021

Order № 81 of 29.06.2021

Rector _____ S. Matyukh
Signature Initials, surname

Khmelnytskyi 2021

SUBMITTED

By the department of Computer Engineering and System Programming

Record № 7 of 19.02 2021

Head of the Department
Signature T. O. Hovorushchenko
Initials, surname

Department of Cyber Security and Computer Systems and Networks

Record № 5 of 17.02. 2021

Head of the Department
Signature Yu. P. Klyots
Initials, surname

PROJECT GROUP

Guarantor (Head of the project group)
A.O.Nicheporuk, Candidate of Engineering Sciences, Associate Professor
Signature Initials, surname, academic degree and rank

Members of the project group:

O.S.Savenko, Doctor of Engineering Sciences, Full Professor
Signature Initials, surname, academic degree and rank

S.M.Lysenko, Doctor of Engineering Sciences, Associate Professor .
Signature Initials, surname, academic degree and rank

D.M.Medzatyi, Candidate of Engineering Sciences, Associate Professor
Signature Initials, surname, academic degree and rank

APPROVED:

Academic Board of the Faculty of Programming and Computer and Telecommunication Systems

Record № 3 of 19.02 2021

Head of the Academic Board
Signature O.S.Savenko
Initials, surname

Academic Board of the Faculty of International Relations

Record № 8 of 25.02. 2021

Head of the Academic Board
Signature V.V.Tretko
Initials, surname

Educational and Methodological Department

Head
Signature L.S.Liubokhynets
Initials, surname

Academic Department

Head
Signature O.H.Samoliuk
Initials, surname

Department for Ensuring the Quality of Higher Education

Head
Signature H.V.Krasylnykova
Initials, surname

APPROVAL FORM

Head of the Student Council of
the Faculty of Programming and Computer and Telecommunication Systems.

Name

Signature — D. Kit (Initials, surname)

Director «IT-Klaster Khmelnytskoho» NGO
Name of the organization, enterprise

Signature — S.O.Yatsyshen
Initials, surname

Director «G M Host» LLC
Name of the organization, enterprise

Signature — A.V.Harmatiuk
Initials, surname

Director «ITT» (IT-telecommunication company) LLC
Name of the organization, enterprise

Signature — V.S.Simohuk
Initials, surname

Educational Program Profile for the Major
123 «Computer Engineering»
Code and name of the major

1. General Information	
Full name of the institution of higher education and structural unit	Khmelnytskyi National University Faculty of Programming and Computer and Telecommunication Systems Department of Computer Engineering and System Programming
Higher education level	Bachelor's
Name of the academic qualification	Bachelor of Computer Engineering
Official name of the educational program	«Computer Engineering and Programming» Educational and Professional Program
Degree type and volume of the educational program	Bachelor's Degree – single major, volume of the educational and professional program – 240 ECTS credits, duration of the study – 4 years
Accreditation	First time accreditation is to be carried out in 2024
Cycle/ level	National Qualification Framework – level 6; FQ-EHEA – first cycle; EQF LLL – level 6
Prerequisites	Complete general secondary education
Language(s) of instruction	English
Validity term of the educational program	5 years
Permanent web page of the educational program	http://www.khnu.km.ua/root/page.aspx?l=0&r=50&p=5&f=Б

2. Aim of the Educational Program
Development of intellectual potential of students, future competitive computer engineers in the labor market in Ukraine and abroad, in the process of their innovative educational, scientific and entrepreneurial activity, capable of successful professional self-realization, transfer of technologies and knowledge adapted to the needs of the modern world and life challenges.

3. Educational Program Characteristics	
Subject area (field of study, major, specialization (if available))	Computer Engineering (12 Information Technology; 123 Computer Engineering) The *objects* of bachelors' professional activity are: - software and hardware (hardware resources, programmable, reconfigured, system and application software) of computers and computer systems of general and special purpose, including stationary, mobile, embedded, distributed, etc., local, global computer networks and the Internet, cyberphysical systems, the Internet of Things, IT infrastructures, interfaces and protocols for the interaction of their components; - information processes, technologies, techniques, methods and systems of automated and automatic design; setting, production and operation, design documentation, standards, procedures and tools for the life cycle management of the named software and hardware; - methods and techniques of information processing, mathematical models of computational processes, computational technologies including high-performance, parallel, distributed, mobile, web-based and cloud, green (energy efficient), secure, autonomous, adaptive, intelligent, smart technologies, etc., architecture and maintenance of the corresponding software and hardware functioning. The *learning objectives* are to train specialists who are able to independently use and implement computer engineering technologies.

	The theoretical content of the course: notions, concepts, principles, methods, software and hardware and technologies for the creation, use and maintenance of computer systems and networks, embedded and distributed computing. *Methods, techniques and technologies* (that should be mastered by the bachelor students for practical application): methods of automated design of software and hardware of computer systems and their components, methods of mathematical and computer modeling, information technology, specialized software development, network, mobile and cloud computing technologies. *Tools and equipment* (objects, devices and facilities that the student learns to use): the student must be able to use: computer equipment, measuring instruments, software and hardware automation and design automation systems.
The target of the educational program	The educational and professional program is targeted at training specialists capable of independent use and implementation of computer engineering technologies; forming and developing general and professional competencies in computer engineering which contribute to the social stability, competitiveness and mobility of the graduate in the labor market; obtaining higher education (taking into account international quality standards of higher education) for the development, implementation and research of computer engineering technologies; meeting the needs of employers and society in qualified bachelors in computer engineering; performing applied research in the field of computer engineering.
The main focus of the educational program and specialization	Specialized education in the field of information technology in the "Computer Engineering" major. The emphasis of the program is placed on the ability to solve complex specialized problems and practical problems in the field of computer engineering, in particular the development of algorithmic support and software, design and development of system and application software of computer systems that involves the use of certain theories and methods of computer engineering and is characterized by complexity and uncertainty of conditions. The main focus of the educational program is to design and organize the operation of computer systems and networks of universal and special purpose, cyberphysical systems, distributed systems, the Internet of Things, as well as the development of appropriate software. Keywords: computers, computer systems, computer networks, cyberphysical systems, information technologies, system software, application software.
Peculiarities of the educational program	Integrated training of specialists for independent use and implementation of computer engineering technologies. In order to provide contact with real production CASE-learning is offered, i.e. the study of several courses with the programs of Khmelnytskyi IT companies in the course of which students will deal with real tasks (cases).
4. Professional Suitability of Graduates and Their Further Study	
Professional suitability	According to the National Occupational Classification ДК 003:2010: 213 – Professional in the field of computing (computerization) 2131 – Professional in the field of computer systems 2131.2 – System Administrator; Computer software engineer 2132 – Professional in the field of programming 2132.2 – Developer of computer programs; Software Engineer; Programmer (database); Application programmer; System programmer 2139 – Professional in other areas of computing (computerization) 2139.2 – Computer application engineer 247 – Safety and quality professional 312 – Technical specialist in the field of computer facilities 3121 – Programming Technician

Further Study	Possibility to study the program of the second (master's) level of higher education (National Qualification Framework – level 7). Acquiring additional qualifications in the system of postgraduate education.
5. Teaching and Assessment	
Teaching and learning	Lectures. Workshops and practical classes. Problem solving classes. Laboratory work. Group work. Research. Internship / practictical training. Online / e-learning. Individual work. Classical (explanation and illustration) and active (problem, interactive, project, self-developing, game, situational, positional and contextual learning, cooperation) learning technologies.
Assessment	Written examinations, pass-fail tests, graded pass-fail tests, presentations, defense of laboratory and practical work, defense of practice, course projects, qualification work, etc.
6. Program Competencies	
Integral competence (IC)	Ability to solve complex specialized problems and practical problems during professional activity in the field of computer science or training which involves the application of theories and methods of computer engineering and is characterized by complexity and uncertainty of conditions.
General competences (GC)	GC1. Ability of abstract thinking, analysis and synthesis GC2. Ability to learn and master modern knowledge GC3. Ability to apply knowledge in practical situations GC4. Ability to communicate in the state language both orally and in writing GC5. Ability to communicate in a foreign language GC6. Interpersonal skills GC7. Ability to identify, raise and solve problems GC8. Ability to work in a team GC9. Ability to exercise one's rights and duties as a member of society, to realize the values of civic (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine GC10. 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; use various forms of activities and exercise for active recreation and conducting a healthy lifestyle *General competences defined by the educational program*: GC11. Ability to understand the subject area and professional activity GC12. Ability to use information and communication technologies GC13. Ability to solve tasks and make appropriate decisions GC14. Ability to develop and manage projects, evaluate and ensure the quality of work performed
Special (professional, subject matter) competences (PC)	PC1. Ability to apply legal and regulatory framework, as well as national and international requirements, practices and standards for the purpose of professional activity in the field of computer engineering. PC2. Ability to use modern methods and programming languages to develop algorithmic programs and software. PC3. Ability to create system and application software for computer systems and networks. PC4. Ability to protect information processed by the computer and in cyberphysical systems and networks in order to implement the established information security policy PC5. Ability to use design automation tools and systems to develop components of computer systems and networks, Internet applications, cyberphysical systems, etc.

	PC6. Ability to design, implement and maintain computer systems and networks of various types and purposes PC7. Ability to use and implement new technologies, including smart, mobile, green and secure computing technologies, to participate in the modernization and reconstruction of computer systems and networks, various embedded and distributed applications, in particular to increase their efficiency. PC8. Willingness to participate in the implementation of computer systems and networks, their installation at facilities for various purposes. PC9. Ability to systematically administer, use, adapt and operate existing information technologies and systems. PC10. Ability to organize workplaces, their technical equipment, placement of computer equipment, use of organizational, technical, algorithmic and other methods and means of information protection. PC11. Ability to draw up the obtained work results in the form of presentations, scientific and technical reports. PC12. Ability to identify, classify and describe the operation of software and hardware, computer systems and cyberphysical systems, networks and their components through the use of analytical and modeling methods. PC13. Ability to solve problems in the field of computer and information technologies, to determine the limitations of these technologies. PC14. Ability to design systems and their components taking into account all aspects of their life cycle and objectives, including design, configuration, operation, maintenance and disposal. PC15. Ability to justify the choice of methods for solving specialized problems, critically evaluate the results and defend the decisions made. *Special competencies defined by the educational program*: PC16. Ability to analyze, synthesize and optimize computer and information technologies using mathematical models and methods. PC17. Ability to provide design and development of quality software and hardware for computer systems and networks. PC18. Ability to develop business solutions and evaluate new technological proposals. PC19. Ability to organize the collection and storage of data in databases and data warehouses, transmission and protection of information in software and hardware of computer systems and networks, including multimedia systems. PC20. Ability to use and manage modern information technology, computer engineering technology, cybersecurity methods and techniques while performing functional tasks and responsibilities.

7. Learning Outcomes (LO)

LO1. To know and understand the scientific principles that underlie the operation of computer tools, systems and networks.
LO2. To have skills in carrying out experiments, data collecting and modeling in computer systems.
LO3. To know the latest technologies in computer engineering.
LO4. To know and understand the impact of technical solutions in the social, economic, social and environmental context.
LO5. To have knowledge of the fundamentals of economics and project management.
LO6. To be able to apply knowledge to identify, formulate and solve technical problems of the job using methods that are most suitable for achieving goals.
LO7. To be able to solve problems of analysis and synthesis of tools specific to the field.
LO8. To be able to think systematically and apply creativity when formulating new ideas.
LO9. To be able to apply knowledge of technical characteristics, design features, purpose and rules of operation of software and hardware of computer systems and networks to solve technical problems in the field.
LO10. To be able to develop software for embedded and distributed applications, mobile and hybrid systems, calculate, operate equipment typical for the field.

LO11. To be able to search for information in various sources to solve problems of computer engineering.
LO12. To be able to work effectively both individually and as a member of a team.
LO13. To be able to identify, classify and describe the operation of computer systems and their components.
LO14. To be able to combine theory and practice as well as make decisions and develop a strategy for solving problems of the field taking into account universal values, social, state and industrial interests.
LO15. To be able to perform experimental research on professional topics.
LO16. To be able to evaluate the obtained results and give reasons for the decisions made.
LO17. To communicate orally and in writing on professional issues in Ukrainian and one of the foreign languages (English, German, Italian, French, Spanish).
LO18. To use information technology for effective communication at the professional and social levels.
LO19. To be able to adapt to new situations, justify, make and implement decisions within one's competence.
LO20. To realize the need for lifelong learning in order to deepen the acquired knowledge and acquire new professional knowledge, improve creative thinking.
LO21. To perform work at a high quality level and achieve the set goal in compliance with the requirements of professional ethics.
Learning outcomes determined by the educational program:
LO22. To apply knowledge of basic natural and general engineering (fundamental) courses as well as system modeling and discrete mathematics in solving typical problems of design and use of software and hardware of computer systems and networks.
LO23. To use basic knowledge of informatics and modern information systems and technologies, programming skills, technologies of safe work in computer networks, methods of creating databases and Internet resources, technologies of development of algorithms and computer programs in high-level languages with application of object-oriented programming to solve problems of design and use of software and hardware of computer systems and networks.
LO24. To justify the choice of methods for collecting, storing, transmitting and protecting information in software and hardware of computer systems and networks, including multimedia systems.
LO25. To administer, use, adapt and operate existing information and computer engineering technologies to ensure the protection of information in computer systems and networks in order to implement the established information security policy.

8. Resources for the Educational Program Implementation

Staff	All scientific and pedagogical workers who teach this educational and professional program have the qualification relevant to the profile and focus area of the courses taught, have the necessary experience of pedagogical work. All professors have the level of scientific and professional activity fulfilling at least four points of licensing requirements. Professors are constantly working on the implementation of international grant projects. Professionals with experience in research, management, innovation, creative work and work in the field are involved in the organization of the educational process.
Logistic support	Five specialized computer laboratories equipped with modern computer and specialized equipment, three equipped classrooms for practical and lecture classes with multimedia tools.
Information and educational and methodical support	Availability of: - Ukrainian and foreign professional periodicals in the relevant field in the library (including electronic form); - access to publications in scientometric databases such as Scopus, Web of Science; - the official website of KhNU which provides basic information on the organization of the educational process; - MOODLE modular learning environment; - electronic library of the university; - educational program, curriculum, academic course working programs, syllabuses in all courses of the curriculum; - practical training programs; - instructional guidelines for laboratory and practical work.

9. Academic Mobility	
National credit mobility	National credit mobility is planned for some training modules that provide the acquisition of general competences.
International credit mobility	Agreement on International Academic Mobility (Erasmus + KA1) with the University of Ostrava (Czech Republic) for 2015-2021. Agreement on International Academic Mobility (Erasmus + KA1) with Mendel University, Brno (Czech Republic) for 2019-2022.
Training foreign students	English-language educational program "Computer Engineering and Programming" of the first (bachelor's) level of higher education

II. Components of the Educational Program and Their Logical Order

2.1. Components of the Educational Program

CEP code number	Components of the Educational Program (CEP) (courses, course projects (works), practical trainings, qualification work)	ECTS credits	Final control	Semester
Compulsory Components of the Educational Program				
Genral Preparation Components(GPC)				
GPC.01	Higher Mathematics	15	examination	1, 2
GPC.02	Discrete Mathematics	5	examination	1
GPC.03	Physics	8	examination	2
GPC.04	Ukrainian (as a foreign language)	10	pass/ fail test	2,4
GPC.05	Theory of Electric and Magnetic Circuits	5	examination	3
GPC.06	Probability Theory and Mathematical Statistics	4	examination	4
GPC.07	Life Safety, Occupational Safety, Civil Defense and Ecological Safety	5	examination	8
GPC.08	Philosophy	4	pass/ fail test	7
GPC.09	Culture Studies, Culture of Speech, Ethics and Aesthetics	4	pass/ fail test	6
GPC.10	Civic Society, Economics and Management	4	pass/ fail test	5
GPC.11	English Professional Purposes	4	pass/ fail test	1
	Total	*68*		
Professional Training Components (PTC)				
PTC.01	Programming	14	examination, pass/ fail test, course project	1,2
PTC.02	Web Technologies	5	examination	2
PTC.03	Databases	5	examination	4
PTC.04	System Software	9	examination, course project	5,6
PTC.05	Computer Circuit Design and Computer-Aided Design Systems	7	examination, course project	5
PTC.06	Computer Architecture	6	examination	6
PTC.07	System Programming and Internet of Things	4	examination	7
PTC.08	System Modeling	8	examination, course work	4
PTC.09	Computer and Cyberphysical Systems	5	examination	7
PTC.10	Object-Oriented Programming	5	examination	3
PTC.11	Computer Networks, System Administration and Cyber Security	7	examination, course project	7
PTC.12	Computer Logic	8	examination, course project	3
PTC.13	Information Technology	4	pass/ fail test	1
PTC.14	Data Processing and Multimedia Systems	5	examination	5

PTC.15	Design and Technological Practical Training	5	graded pass/ fail test	6
PTC.16	Pre-graduation Practical Training	5	graded pass/ fail test	8
PTC.17	Bachelor Thesis	10	defense	8
PTC.18	Attestation examination (Ukrainian Language)		attestation examination	7
	Total	*112*		
	Total for compulsory components	180		
ELECTIVE COMPONENTS OF THE EDUCATIONAL PROGRAM				
	Elective courses 3 semester	10	pass/ fail test*	3
	Elective courses 4 semester	10	pass/ fail test*	4
	Elective courses 5 semester	10	pass/ fail test*	5
	Elective courses 6 semester	10	pass/ fail test*	6
	Elective courses 7 semester	10	pass/ fail test*	7
	Elective courses 8 semester	10	pass/ fail test*	8
	Total for the elective components	60		
	Total for the educational program	240		

* - the number of tests depends on the students' choice of elective courses

2.2. Structural and logical outline of the educational program

The structural and logical outline determines the scientific and methodological structuring of the process of implementing the educational program, ie a brief description of the logical sequence of studying the compulsory components of the educational program. The structural and logical outline is presented in the form of a graph (Appendix A).

2.3. Elective components of the educational program

Elective components of the educational program are selected by students from the university catalog of elective courses which is formed from academic courses provided by different departments at different levels of higher education. The creditworthiness of elective courses is divisible by 4. Every year the list of elective educational components from each department is updated. In this program the students are to choose 2-3 courses with a total number of 10 credits in each semester from the 3rd to the 8th. The selection procedure is carried out within the time limits established by the Regulations on the Procedure for Free Choice of Academic Courses by students of Khmelnytskyi National University. The catalog of elective courses is posted on the university website.

III. Forms of student attestation

Attestation of students under the educational program "Computer Engineering and Programming", specialty 123 "Computer Engineering" of the first (bachelor's) level of higher education is carried out in the form of an attestation exam in Ukrainian in the 7th semester and in the form of public defense of qualifying work (Bachelor Thesis) in the 8th semester.

The qualifying work (Bachelor Thesis) contains the results of analytical and theoretical, systems or experimental research of one of the current tasks of the specialty 123 "Computer Engineering" within the framework of professional activity of bachelors, as well as the results of design, modeling, implementation and testing of computer tools specified in the task, students must show the achievement of learning outcomes defined by this educational and professional program, their ability to logically present their views on the topic based on modern scientific methods, justify the choice of hardware and software, draw sound conclusions and formulate specific proposals and recommendations regarding the obtained results.

There can be no academic plagiarism, falsification or copying the qualifying work.

Qualifying papers must be published on the official website of the higher education institution or its subdivision (department), or in the repository of the higher education institution (Khmelnytskyi National University).

IV. Requirements to the internal system for ensuring the quality of higher education

The internal system for ensuring the quality of the educational process and higher education (hereinafter - ISEQ) at the University meets the requirements of European standards and recommendations for quality in higher education, Article 16 of the Law of Ukraine "On Higher Education" (2014). The established ISEQ operates at five organizational levels in accordance with the developed regulations which are posted on the University's website in the category "Public Information" (http://khnu.km.ua/root/files/01/06/03/024.pdf).

The ISEQ includes:

1) definition of principles and procedures for quality ensuring in higher education;

2) monitoring and regular review of educational programs;

3) annual evaluation of students, scientific and pedagogical and pedagogical staff of the University and regular publication of the results of such evaluations on the official website of the University, on information boards and in any other ways;

4) providing advanced training of pedagogical, scientific and scientific-pedagogical workers;

5) ensuring the availability of necessary resources for the organization of the educational process, including materials for independent work of students, for each educational program;

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

7) ensuring the publicity of information about educational programs, degrees of higher education and qualifications;

8) ensuring compliance with academic integrity by university staff and students, including the creation and operation of an effective system for the prevention and detection of academic plagiarism;

9) other procedures and measures.

The ISEQ is evaluated by the National Agency for Quality Ensurance in Higher Education at the request of the university or its accredited independent institutions for evaluation and quality ensurance of higher education for compliance with the requirements for quality ensurance system approved by the National Agency for Quality Ensurance in Higher Education.

V. Matrix of compliance of program competences with the components of the educational program

The matrix of compliance of program competences with the compulsory components of the educational program is given in Appendix B.

VI. Matrix of providing learning outcomes (LO) with the relevant components of the educational program

The matrix of providing program learning outcomes (LO) with compulsory components of the educational program is given in Appendix C.

Sources

1. Law of Ukraine “On Education” [Electronic resource]. - Access mode: http://zakon3.rada.¬gov.ua/laws/show/2145-19.

2. Law “On Higher Education” [Electronic resource]. - Access mode: http://zakon4.rada.gov.¬ua/laws/show/1556-18.

3. Levels of the National Qualifications Framework [Electronic resource]. - Access mode: https://mon.gov.ua/ua/osvita/nacionalna-ramka-kvalifikacij/rivni-nacionalnoyi-ramki-kvalifikacij.

4. The Standard of Higher Education of Ukraine for the Specialty 123 – Computer Engineering approved by the Decree of the Ministry of Education and Science of November 19, 2018 № 1262.

5. Licensing Requirements for Educational Activities. Resolution of the Cabinet of Ministers of December 30, 2015 № 1187 (with amendments by the resolution of the Cabinet of Ministers of March 245, 2021 № 365).

6. Instructional Guidelines for the Development of Standards of Higher Education. Decree of the Ministry of Education and Science of 01.06.2017 № 600 (with amendments by the Decree of the Ministry of Education and Science of 30.04.2020 № 584).

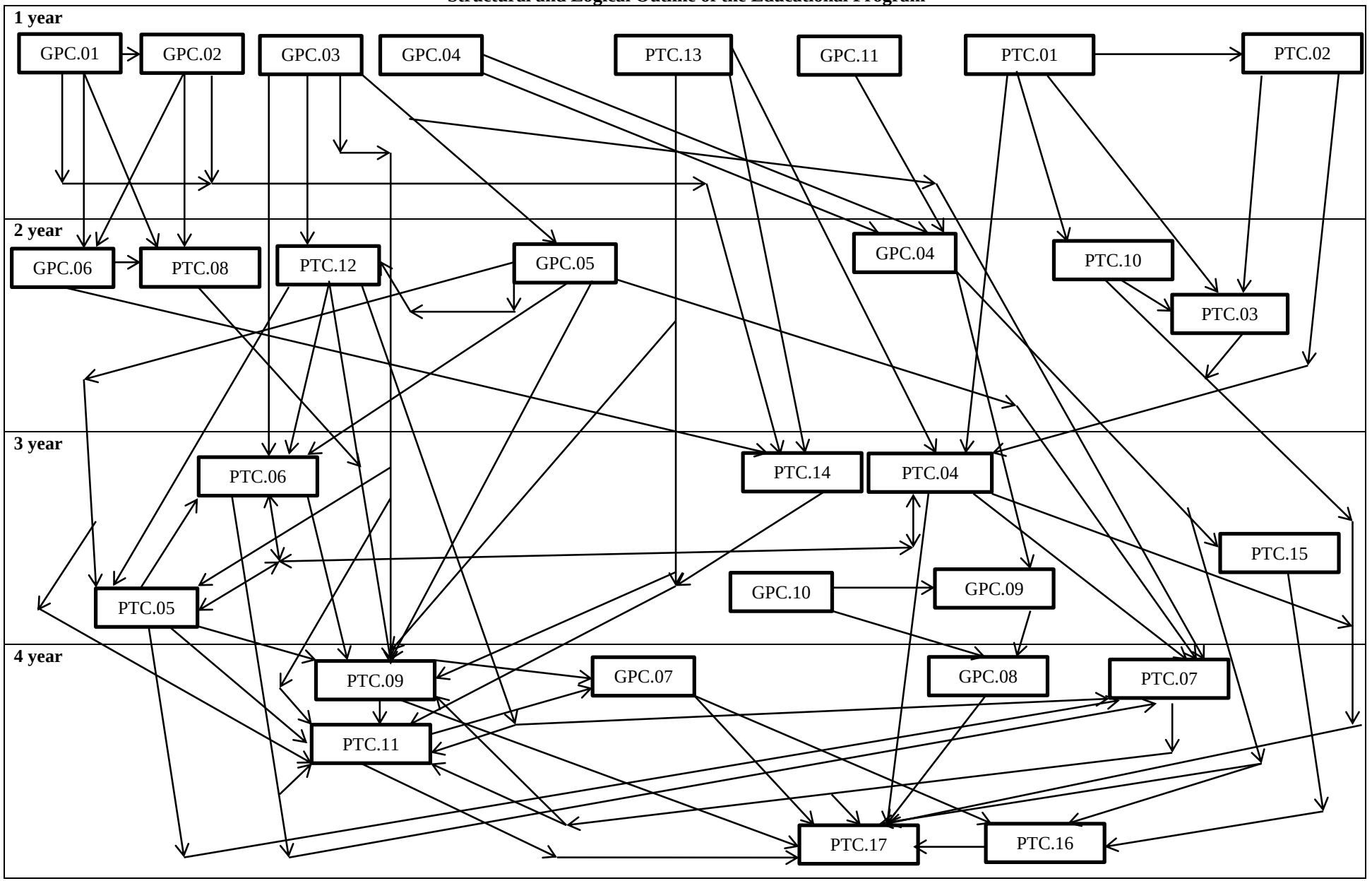
7. Instructional Guidelines for Educational Programs for Training Specialists of Different Levels of Higher Education at Khmelnytskyi National University (approved by the Scientific and Methodological Council of the University, Record of 26.12.2018 № 4).

8. Letter of the Ministry of Education and Science dated 05.06.2018 № 1 / 9-377 “Regarding the Clarification of Educational Programs Design”.

9. Letter of the Ministry of Education and Science dated 28.04.2017 № 1 / 9-239 “Sample of Educational and Professional Program for the First and Ssecond Levels of Higher Education”.

Appendix A

Structural and Logical Outline of the Educational Program



Appendix B

Matrix of Compliance of Program Competences with the Components of General Preparation the Educational Program

	GPC.01	GPC.02	GPC.03	GPC.04	GPC.05	GPC.06	GPC.07	GPC.08	GPC.09	GPC.10	GPC.11
IC	+	+	+	+	+	+	+	+	+	+	+
GC1	+	+				+		+			
GC2	+	+	+	+	+	+		+			+
GC3	+	+	+		+	+	+				
GC4	+	+	+		+	+	+	+	+	+	
GC5				+							+
GC6				+					+	+	+
GC7											
GC8											
GC9									+	+	
GC10			+		+		+	+	+	+	
GC11			+		+						
GC12											
GC13	+	+	+		+	+					
GC14										+	
PC1				+			+				+
PC2											
PC3											
PC4											
PC5											
PC6											
PC7											
PC8							+				
PC9											
PC10							+				
PC11				+							+
PC12			+		+						
PC13											
PC14											
PC15				+							+
PC16	+	+				+		+			
PC17											
PC18										+	
PC19											
PC20											

Matrix of Compliance of Program Competences with the Components of Professional Training

	PTC. 01	PTC. 02	PTC. 03	PTC. 04	PTC. 05	PTC. 06	PTC. 07	PTC. 08	PTC. 09	PTC. 10	PTC. 11	PTC. 12	PTC. 13	PTC. 14	PTC. 15	PTC. 16	PTC. 17
IC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC1					+	+						+					+
GC2	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+
GC3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC5																	+
GC6		+				+									+	+	+
GC7	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+
GC8		+				+									+	+	+
GC9																	+
GC10																	+
GC11	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC12	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+
GC13	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC14		+				+									+	+	+
PC1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PC2	+	+		+			+			+							+
PC3	+	+		+			+			+							+
PC4									+		+			+			+
PC5					+	+			+		+						+
PC6									+		+						+
PC7							+		+		+		+				+
PC8									+		+						+
PC9									+		+		+				+
PC10											+			+			+
PC11		+								+					+	+	+
PC12					+	+		+	+		+	+					+
PC13													+		+	+	+
PC14					+	+			+		+	+					+
PC15		+			+	+				+		+			+	+	+
PC16					+	+		+				+	+				+
PC17	+	+		+	+	+	+		+	+	+	+			+	+	+
PC18		+				+	+			+					+		+
PC19			+											+			+
PC20							+				+		+		+	+	+

Appendix C

Matrix of Providing Program Learning Outcomes (LO) with Compulsory Components of General Preparation of the Educational Program

	GPC.01	GPC.02	GPC.03	GPC.04	GPC.05	GPC.06	GPC.07	GPC.08	GPC.09	GPC.10	GPC.11
LO1			+		+			+			
LO2			+		+						
LO3											
LO4							+		+	+	
LO5										+	
LO6											
LO7	+	+	+		+	+		+			
LO8								+			
LO9			+		+						
LO10											
LO11				+							+
LO12				+							+
LO13											
LO14							+		+	+	
LO15			+		+						
LO16				+							+
LO17				+					+		+
LO18											
LO19											
LO20				+							+
LO21									+		
LO22	+	+	+		+	+					
LO23											
LO24											
LO25											

Matrix of Providing Program Learning Outcomes (LO) with Compulsory Components of Professional Training

	PTC. 01	PTC. 02	PTC. 03	PTC. 04	PTC. 05	PTC. 06	PTC. 07	PTC. 08	PTC. 09	PTC. 10	PTC. 11	PTC. 12	PTC. 13	PTC. 14	PTC. 15	PTC. 16	PTC. 17
LO1					+	+			+		+	+					+
LO2								+	+		+						+
LO3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO4															+	+	+
LO5		+				+				+					+	+	+
LO6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO7	+	+		+	+	+	+			+		+					+
LO8		+				+	+			+		+			+	+	+
LO9					+	+	+		+		+	+					+
LO10	+	+		+			+		+	+	+						+
LO11	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO12		+				+				+					+	+	+
LO13					+	+			+		+	+					+
LO14							+								+	+	+
LO15	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO16		+				+				+					+	+	+
LO17	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO18	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO19	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO22								+	+		+	+					+
LO23	+	+	+	+			+		+	+	+		+				+
LO24			+						+		+			+			+
LO25									+		+		+	+			+