MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
National Technical University
"Kharkiv Polytechnic Institute"

EDUCATIONAL AND PROFESSIONAL PROGRAM «MODERN PROGRAMMING, MOBILE DEVICES AND COMPUTER GAMES»

(for foreign students)

HIGHER EDUCATION LEVEL	FIRST (BACHELOR)
TITLE OF SPECIALTY	123 COMPUTER ENGINEERING
BRANCH OF KNOWLEDGE	12 INFORMATION TECHNOLOGIES

APPROVED by the Academic Council of the NTU "KhPI"
Chairman of the Academic Council
_____ L.Tovazhnyansky
(protocol №1 from "08" 01 2019 year)

Educational and professional program is put into operation
Rector _____ E.I. Sokol
(protocol №2 from "25" 01 2019 year)

Kharkiv 2019

CONTENT

PREFACE

Developed by the working group of the Department of Computer Engineering and Programming of the Faculty of Computer and Information Technologies of the National Technical University "Kharkiv Polytechnic University" on the basis of the standard of higher education by specialty 123 Computer Engineering in the branch of knowledge 12 Information Technologies for the first (Bachelor) level of higher education, approved by the order of the Ministry of Education and Science of Ukraine No. 1262 of 19.11.18.

CERTIFICATE OF APPROVAL
Educational and professional program

Higher Education Level	First (Bachelor)
Branch of Knowledge	12 Information Technologies
Specialty	123 Computer Engineering
Qualifications	Bachelor of Computer Engineering

APPROVED
Head of the Support Group
for the specialty Computer Engineering
Council
_____ S.G. Semenov
«__» _____ 2019

RECOMMENDED
Methodical Council of the NTU "KhPI"
Deputy Chairman of the Methodical
_____R.P. Mygoushchenko
«__» _____ 2019

AGREED
Head of Department
of Computer Engineering
and Programming
_____ S.G. Semenov
«_____»_____2019

AGREED
Dean of Faculty
of Computer and Information
Technologies
_____M.I. Hlavchev
«_____»_____2019

APPROVED AND PUT INTO ACTION

By order of the Rector of the National Technical University "Kharkiv Polytechnic Institute" from "___" _____ 2019 No. _____

INTRODUCTION

Educational and professional program is a system of educational components at the appropriate level of higher education within the specialty that defines the requirements for the level of education of persons who can begin education under this program, the list of academic disciplines and the logical sequence of their study, the number of ECTS credits required for this program, as well as the expected teaching outcomes (competencies) that a graduate of the relevant higher education level must possess.

The educational and professional program is used during:

- Inspection of educational activities in the specialty;
- development of a curriculum and programs of academic disciplines;
- formation of working programs of educational disciplines, practices, individual tasks;
- formation of individual student curricula;
- development of means of diagnostics of higher education quality;
- certification of applicants for higher education;
- professional orientation of the applicants in the specialty;
- external quality control of specialists training.

Consumers of the educational and professional program are:

- applicants for higher education;
- scientific and pedagogical workers of higher educational establishments (scientific institutions);
- applicants for the corresponding level of higher education;
- scientific and pedagogical workers who carry out training of specialists in the field of Computer Engineering;
- Examination commission on the specialty Computer Engineering;
- Admission Board of the Academy;
- employers for information on the academic and professional profile of graduates;
- competent specialists in recognition of documents on higher education;
- accreditation institutions.

The educational program extends to the departments involved in the training of specialists in the bachelor's degree in specialty 123 Computer Engineering.

1. PROFILE OF EDUCATIONAL AND PROFESSIONAL PROGRAM

1.1 GENERAL INFORMATION

The official title of the educational	Modern programming, mobile devices and computer games
Higher education level	First (bachelor)
Higher education degree	Bachelor
Branch of	12 Information Technologies
Specialty	123 Computer Engineering
Availability of accreditation	Valid until **01.07.2025**
Educational qualification	Bachelor of Computer Engineering
Qualification in the diploma	Degree of Higher Education – Bachelor Specialty – 123 Computer Engineering Educational program – Modern programming, mobile devices and computer games
Type of diploma	Bachelor's diploma, unitary
Training period	3 years 10 months, 240 ECTS credits
Cycle / Level	National QF of Ukraine - level 7, FQ-EHEA - first cycle, EQF-LL - level 6
Prerequisites	Complete secondary education diploma of junior specialist (junior bachelor)

A	**PURPOSE OF THE PROGRAM**
	The purpose of the bachelor program in the specialty Computer Engineering is the preparation of bachelors, which involves the theoretical knowledge skills and abilities and other competencies necessary for the performance of professional duties in the staff and possible initial positions of the Bachelor of Computer Engineering within the framework of objects of professional activity in the chosen specialization, solving scientific problems in the field of computer sciences and information technologies and conducting own scientific research, which results have a scientific novelty, theoretical and practical significance.

B	**CHARACTERISTICS OF THE EDUCATIONAL PROGRAM**	
1	**Description of the subject area**	**Branch of Knowledge** – 12 Information Technologies **Specialty** – 123 Computer Engineering **Objects of study:** - software and hardware (hardware, programmable), system and application software for computers and computer systems of

		universal and special purpose, including stationary, mobile, built-in, distributed, etc., local, global computer network, interfaces and protocols for the interaction of their components. - information processes, technologies, methods, techniques and systems of automated and automatic designing; adjustment, production and operation, project documentation, standards, procedures and means of supporting the management of the life cycle of these software and hardware. - methods and techniques for processing information, mathematical models of computing processes, computing technologies, including high-performance, parallel, distributed, mobile, web-based and cloud-based, energy-efficient, safe, autonomous, adaptive, and intellectual, intelligent, etc., the architecture and organization of the operation of the corresponding software and hardware. **Objectives of the training:** formation of the competences, knowledge and skills necessary for carrying out professional duties on the possible initial positions of the bachelor of computer engineering within the framework of objects of professional activity in the chosen specialization. **Theoretical content of the subject area:** consists of terms, conceptions, principles, methods, which are related to software and hardware means and technologies of research, design, production, service and use of means within the framework of professional activities that provide the acquisition of appropriate competences for chosen specialization. **Methods, techniques and technologies:** general scientific and special methods and procedures for analysis and forecasting of processes carried out in computer and information systems, and development and research of technologies of management of these processes. The applicant for higher education for application in practice must possess the methods of fundamental and applied sciences, technologies of computing, methods of computer-aided design of software and hardware of computer systems and networks and their components, mathematical and computer modeling, information technologies, professional application programs, modern programming languages. **Tools and equipment:** modern computer and information systems and networks, control and measurement devices, automation software and hardware and computer-aided design systems. Operating systems, system and applied software, cloud computing and internet applications.
2	**Programs Focus: general/ special**	General education of bachelor's professional activities is aimed at: - software and hardware (hardware, programmable), system and application software for computers and computer systems of universal and special purpose, including stationary, mobile, built-in, distributed, etc., local, global computer network interfaces and protocols of interaction of their components. - methods and techniques for processing information, mathematical

		models of computing processes, computing techniques, including high-performance, parallel, distributed, mobile, web-based and cloud-based, energy-efficient, safe, autonomous, adaptive, intellectual, intelligent, etc., architecture and organization of operation appropriate software and hardware. **Key words:** information technologies, software and hardware, hardware-software and technical means.
3	**Program orientation**	*Research.* Conducting research work on the analysis of trends in hardware and software development modern computer and information systems and means of their modeling in order to implement innovative projects. *Designing.* Design and development of specialized hardware, mobile devices. Creating applications for various purposes, system programs to upgrade existing software, to develop applications based on client-server technologies. *Organizational.* Organization and provision of professional activities in the team, ensuring occupational safety and safety, providing social protection of employees, organization of cooperation with firms working in the field of IT technologies, formation of a team and its management, formation and development of organizational culture, organization of investment activity of the enterprise. *Educational and methodical.* The mastery of methods and techniques of pedagogical skills, the development of teaching and methodological support, the possession of pedagogical technique and technology.
4	**Program features**	An applicant for higher education must possess the methods of fundamental and applied sciences, the technologies of computing, the methods of computer-aided design of software and hardware of computer systems and networks and their components, mathematical and computer modeling, information technologies, professional application programs, modern programming languages, methods and technologies of adjustment, production and operation of software and hardware of computer systems and networks, standards, procedures and means of support of lifecycle management of these software and hardware, design methods, organizational and administrative activities.

5	**Employment**	Names of professions according to the National Classifier of Ukraine: Classification of occupations (DK 003: 2010) **2** Professionals **21** Professionals in the field of physical, mathematical and technical sciences **213** Professionals in the field of computing (computerization) **2131** Professionals in the field of computing systems **2131.1** Scientific staff (computing systems) **2131.2** Developers of computing systems **2132** Professionals in the field of programming **2132.1** Scientific staff (programming) **2132.2** Developers of computer programs **2139** Professionals in other fields of computing (computerization) **2139.2** Professionals in other fields of computing
6	**Education continuation**	Life-long learning for development and self-improvement in the scientific and professional spheres of activity, as well as in other related fields of scientific knowledge: - preparation for the 8th qualification level of the National Framework of Qualifications in the field of management and administration; - training at the 7th qualification level of the National Qualifications Framework in related specialties; - educational programs, research grants and scholarships, which include additional scientific and educational components.

C	**LIST OF THE GRADUATE COMPETENCIES**
Integral competence	Ability to solve complex tasks and solve practical tasks during professional activity in the computer industry of information technologies, which involves application of theories and methods of computer engineering and characterized by complexity and uncertainty of the conditions.
General competence	Z1 Ability to think, analyze and synthesize abstract. Z2 Ability to learn and self-learn (search, process and analyze information from different sources). Z3 Ability to apply knowledge in practice. Z4 Free oral and written communication in Ukrainian and ability communicate read and write in a foreign language. Z5 Interpersonal skills and abilities. Z6 Skills of using information and communication technologies. Z7 Ability to solve the tasks and make the appropriate decisions. Z8 Ability to assess and ensure the quality of work performed. Z9 Ability to work individually and in a team. Z10 Basic research skills and abilities. Z11 Adherence and promotion of a healthy lifestyle.
Special	P1. Basic knowledge of technical characteristics, design features, application and rules of operation of computer systems, networks and software and

(professional, subject matter) competence	hardware. P2. Ability to use the methods of fundamental and applied disciplines for the processing, analysis and synthesis of the results of professional research. P3. Ability to develop algorithmic and software components of computer systems and networks, Internet applications, cyber-physics systems with the use of modern programming methods and programming languages, as well as design tools and systems for automation, etc. P4. Ability to design, implement and maintain computer systems and networks of different types and destinations. P5. Ability to create system and application software for computer systems and networks. P6. Ability to use and implement new technologies, including smart, mobile, green and safe computing technologies, participate in the modernization and upgrading of computer systems and networks, various embedded and distributed applications, in particular to increase their efficiency. P7. Readiness to participate in the work on the introduction of computer systems and networks, putting them into operation at objects of different destination. P8. Ability to manage and ensure the quality of products and services of information technology during their life cycle. P9. Ability to systematically administer, use, adapt and operate existing information technologies and systems. P10. Ability to organize workplaces, their technical equipment, placement of computer equipment, using organizational, technical, algorithmic and other methods and means of information protection. P11. Ability to execute received working results in the form of presentations, scientific and technical reports, articles and reports at scientific and technical conferences. P12. Ability to identify, classify and describe the work of software, hardware, computer systems, networks and their components through the use of analytical methods and methods of modeling. P13. Ability to investigate the problem in the field of computer and information technologies, determine their limitations. P14. Ability to design systems and their components, taking into account all aspects of their lifecycle and task, including the creation, configuration, operation, maintenance and disposal. P15. Ability to argue the choice of methods for solving specialized tasks, to critically evaluate the results and to protect the decisions made. P16s. Ability to develop client-server applications based on HTML5, CSS, JavaScript and Python. P17s. Ability to correct errors in the software that is in use. P18s. Ability to choose the optimal data structures, implement their non-standard representation to ensure the required indicators of the developed programs. P19s. Ability to develop effective algorithms developed by systems and applications, perform their debugging and testing P20s. Ability to design, develop and apply databases. P21s. Ability to develop strategies, scenarios and algorithms for computer games.

	P22s. Ability to create software components of computer games.

D	THE PROGRAM TEACHING OUTCOMES
Program teaching outcomes	N1 Know and understand the scientific and mathematical provisions underlying the functioning of computer facilities, systems and networks. N2 Know the basics of professionally-oriented disciplines of the specialty. N3 Have knowledge and skills in experiments, data collection and simulation in computer systems. N4 Have knowledge of the latest technologies in the field of computer engineering. N5 Know and understand the influence of technical solutions in the social, economic, social and environmental context. N5s Know the basics of designing client-server applications. N6s Know computer gaming technology. N6 Be able to apply knowledge to identify, formulate and solve technical problems of a specialty, using known methods. N7 Be able to apply knowledge to solve problems of analysis and synthesis of tools specific to the specialty. N8 Be able to think systematically and apply creative abilities to the formation of fundamentally new ideas. N9 Be able to apply knowledge of technical characteristics, design features, purpose and rules of operation of software and hardware of computer systems and networks for solving technical problems of the specialty. N10 Be able to develop software for embedded and distributed applications, mobile and hybrid systems, calculate, exploit, typical for equipment specialty. N11 Be able to search information in various sources for solving computer engineering tasks. N12 Be able to work effectively both individually and in a team. N13. Be able to identify, classify and describe the work of computer systems and their components. N14 Be able to combine theory and practice, and also to make decisions and to develop a strategy of activity for solving the tasks of a specialty taking into account human values, public, state and industrial interests. N15 Be able to carry out experimental research on professional topics. N16 Be able to evaluate the results and reasonably defend the decisions made. N17s. Be able to create dynamic web pages. N18s. Be able to create new functionality and eliminate mistakes in the software. N19s. Be able to describe the strategy of computer games and implement it N17 Ability to communicate, including oral and written communication in Ukrainian and one of the foreign languages (English, German, Italian, French, Spanish). N18 Ability to use information technology and other methods for effective communication at the professional and social levels.

	N19 Ability to adapt to new situations, to justify, accept and implement within the limits of competence the decision. N20 Realize the need for lifelong learning in order to deepen the acquired and gain new professional knowledge, improve creative thinking. N21. Responsibility for the work to be done and achieve the goal in accordance with the requirements of professional ethics.

2 FORMS OF CERTIFICATION OF APPLICANTS FOR HIGHER EDUCATION

Forms of certification of applicants for higher education	Public defence (demonstration) of qualifying work.
Requirements for qualification work (in the presence)	The qualifying work is a self-made research and development work of the student, who provides the author's vision of the problem, possibilities to its research and solution. The work testifies to the ability of the author to conduct empirical research, develop appropriate systems (tools), to substantiate the design decisions, to process and analyze the received results, to formulate reasoned conclusions. The completion of graduation work should be facilitated by: - systematization, consolidation and expansion of theoretical and practical knowledge of the specialty and the application of this knowledge to solve specific tasks; - development of skills of independent work and mastering method of solving tasks and problems set in graduation work; - assessment of the level of ownership of a certain set of professional competencies required for future professional activities.
Requirements for public defence (demonstrations) (in the presence)	The report consists of three semantic parts that are correspond by the content to the introduction, the main part and the conclusions of the qualification work. The introduction of the report highlights the relevance of the problem under study, and formulates its object, subject, hypotheses and research and development tasks. The main part, first of all, reveals the essence, methodology and features of organizing and conducting research and project development. In conclusions are the main results of the study and development, determines the theoretical and practical value of the obtained results and possible perspectives of further research and development. Assessments of the qualifying work are made by the members of the examination commission at its private meeting. The Examination Commission takes into account the content of the work, substantiation of the conclusions, contents of the report, level of presentation of the project and answers to questions, job responses, theoretical and practical training of the student. Estimates of the qualifying work are announced the same day after the end of the defence of the entire group and the registration of the minutes of the meeting of the Commission. According to the results of the final certification of the students, the Examination Commission decides on the award of a qualification in the specialty and the issuance of a bachelor's degree.

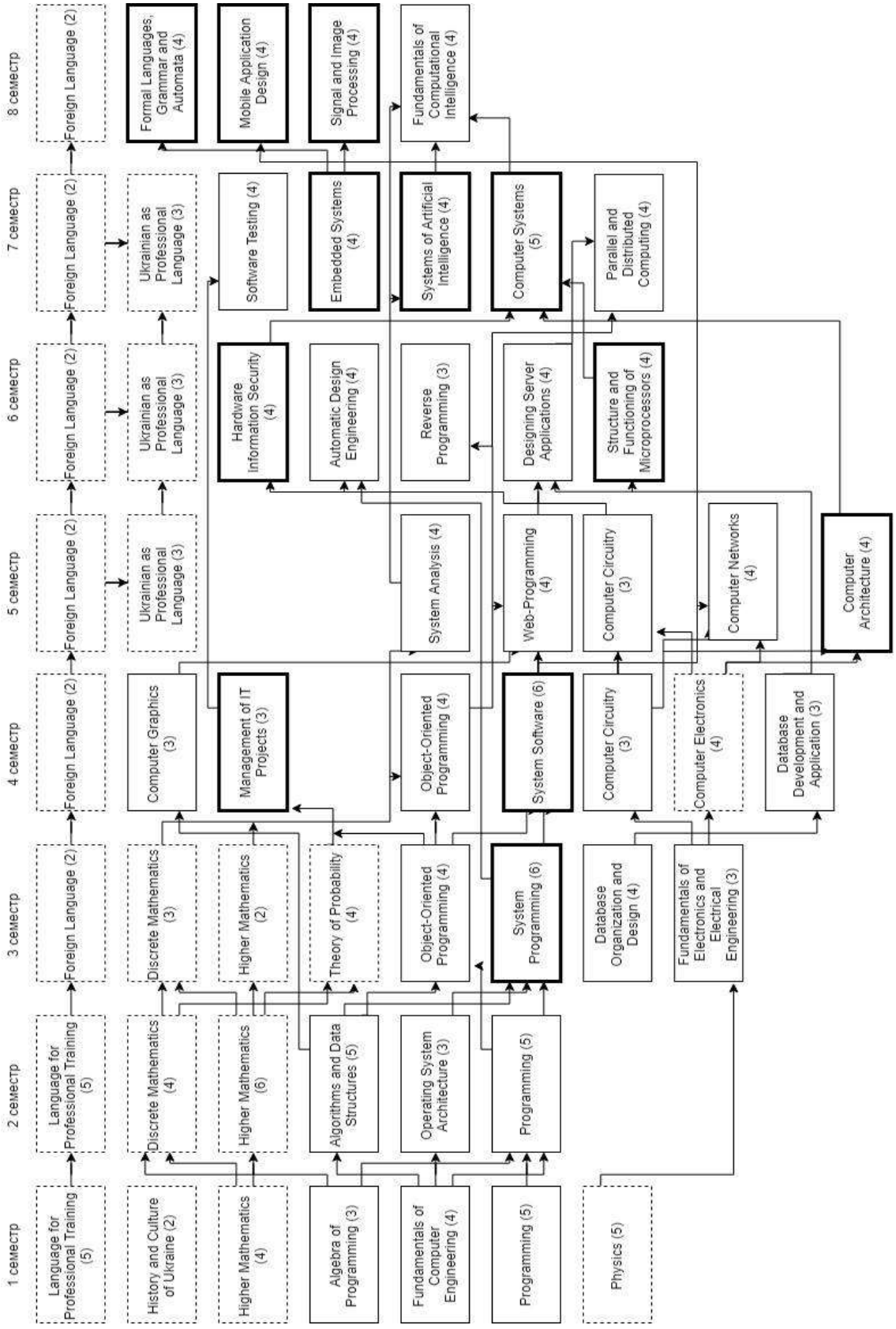
3 REQUIREMENTS FOR THE EXISTENCE OF THE INTERNAL SECURITY SYSTEM OF HIGHER EDUCATION

Prnciples and procedures ensuring the quality of education	Principles: - compliance with European and national standards of quality of higher education; - autonomy of a higher education institution that is responsible for ensuring the quality of educational activities and the quality of higher education; - a systematic approach that involves managing quality at all levels of the educational process; - monitoring the quality of education; - involving students, employers and other stakeholders in the quality assurance process; - openness of information at all stages of quality assurance. Procedures: - improvement of planning of educational activity; - approval, monitoring and periodic review of educational programs; - improving the quality of the training of contingents of applicants for for higher education; - strengthening the personnel potential of the academy; - ensuring the availability of the necessary resources for the organization of educational process and support of applicants for higher education; - development of information systems in order to improve the management of the educational process; - providing publicity about the activities of the academy; - creation of an effective system for preventing and detecting academic plagiarism in the scientific works of lecturers andapplicants for higher education.
Monitoring and periodic revision of the programs	Regular monitoring, review and updating of educational programs are aimed at ensuring the appropriate level of educational services, as well as creating a favorable and effective learning environment for applicants for higher education. This involves evaluating: the content of the program, ensuring compliance with the program requirements; changing needs of society; the academic load of applicants for higher education, their achievements and the results of the completion of the educational program; the effectiveness of student evaluation procedures; expectations, needs and satisfaction of applicants for higher education with content and learning process; the educational environment corresponds to the purpose and content of the program; quality of service for applicants for higher education. Programs are regularly reviewed and updated after the completion of the full cycle of training before the beginning of the new academic year.

Assessment of applicants for higher education	Assessment of student learning outcomes is carried out during the control activities. Control measures include current and semester control. The task of the current control is to test the understanding and assimilation of certain material, developed skills of performing the calculations, the ability to independently elaborate texts, to publicly or in writing, to present a particular material, etc. The forms of current control are: the implementation of individual tasks; performance of test tasks; execution of control works performed in the auditorium or during independent work; writing and defense of abstracts; defence of laboratory works. The final control is carried out in order to evaluate the results of training at the appropriate educational level or at some of its final stages. The final control includes semester control (exam, differential credit or credit from a particular discipline) and student certification. Semester control is carried out in the form of a semester examination or a score from a specific academic discipline in the amount of study material defined by the curriculum, and in the terms established by the curriculum. For control of student success at the level of the administration, monitoring control works are carried out. Academic disciplines, for which monitoring control works planned, and timing of control measures are determined by the schedule of the educational process. Assessment of the results of the University students' training is carried out by methods that are specific to the specific discipline. The student's progress monitoring is carried out using a 100-point rating system with the obligatory transfer of grades to the national scale and the ECTS scale.
Qualification improvement for scientific and pedagogical, pedagogical and scientific workers	The system of professional development of scientific and pedagogical, pedagogical and scientific workers is developed in accordance with the current normative base and is based on the following principles: compulsory and periodicity of the training and qualification improvement; transparency of the organization of internship and advanced training; monitoring the compliance of the contents of the programs of professional development with the tasks of professional activity; the mandatory introduction of the results of advanced training in scientific and pedagogical activities; promulgation of the results of internship and advanced training.
Availability of necessary resources for the organization of the educational process	The existing staffing, logistical, teaching and methodological and informational support in the specialty meets the requirements of the existing Licensing Conditions for the educational activities of educational institutions and ensures the implementation of state requirements for a specialist with higher education.
Availability of information systems for effective management of the educational process	In order to manage educational processes an effective policy in the field of information management and an appropriate integrated information management system for the educational process has been developed. This system provides for automation of the main functions of management of the educational process, in particular:

	ensuring the holding of the admission company, planning and organization of the educational process; access to learning resources; accounting and analysis of the success of applicants for higher education; administering the main and auxiliary processes of providing educational activities; monitoring compliance with quality standards. To manage the quality of educational activities at the University the informational system (Educational Process Automated Control System, EPACS) was created.
Publicity of information about educational programs, degrees of higher education and qualifications	Publicity of information about educational programs, degrees of higher education and qualifications is available on the NTU "KhPI" website in open access.
Academic Integrity Compliance by university staff and applicants for igher education	At the University, employees and applicants for higher education pursue academic integrity. The system of ensuring the academic integrity of participants in the educational process is based on the following principles: compliance with generally accepted principles of morality; demonstration of respect for the Constitution and laws of Ukraine and observance of their norms; respect for all participants in the educational process, regardless of their outlook, social status, religious and national affiliation; compliance with the norms of copyright legislation; references to sources of information in the case of borrowing ideas, statements, information; independent performance of individual tasks.
System for prevention and detection of academic plagiarism	An antiplagiarism check is carried out in accordance with the requirements of the University's regulatory documents.

4 STRUCTURAL AND LOGICAL SCHEME OF EDUCATIONAL AND PROFESSIONAL PROGRAM



5 LIST OF NORMATIVE DOCUMENTS, ON WHICH THE HIGHER EDUCATION STADARDS ARE BASED

1. Закон України від 01.07.2014 р. № 1556-VII «Про вищу освіту» [Режим доступу: http://zakon5.rada.gov.ua/laws/show/2145-19];
2. Закон України від 05.09.2017 р. «Про освіту» - [Режим доступу: http://zakon5.rada.gov.ua/laws/show/2145-19];
3. Постанова Кабінету Міністрів України «Про затвердження переліку галузей знань і спеціальностей, за якими здійснюється підготовка здобувачів вищої освіти» від 29.04.2015 р. №266[Режим доступу: http://zakon4.rada.gov.ua/laws/show/266-2015-п];
4. Постанова Кабінету Міністрів України «Про затвердження Ліцензійних умов провадження освітньої діяльності закладів освіти» від 30.12.2015 р. № 1187 [Режим доступу; http://zakon4.rada.gov.Ua/laws/show/l 187-2015-n/page]
5. Постанова Кабінету Міністрів України «Про затвердження Національної рамки кваліфікацій» від 23.11.2011 р. №1341 [Режим доступу: http://zakon4.rada.gov. ua/laws/show/1341 -2011 -п];
6. Національний класифікатор України: «Класифікація видів економічної діяльності» ДК 009: 2010 [Режим доступу; http://www.ukrstat.gov.ua/];
7. Національний класифікатор України: «Класифікатор професій» ДК 003: 2010ДК 003:2010 [Режим доступу: http://www.dk003.com];

Інші рекомендовані джерела

1. Стандарти і рекомендації щодо забезпечення якості в Європейському просторі вищої освіти (ESG) [Режим доступу: http://ihed.org.ua/images/doc/ 04 2016 ESG 2015.pdf];
2. International Standard Classification of Education (ISCED 2011): UNESCO Institute for Statistics [Режим доступу:http://www.uis.unesco.org/education/documents/isced-2011- en.pdf];
3. ISCED Fields of Education and Training 2013 (ISCED-F 2013):UNESCO Institute for Statistics [Режим доступу: http://www.uis.unesco.org/Education/Documents/isced-fields-of-educationtraining-2013.pdf].
4. Методичні рекомендації щодо розроблення стандартів вищої освіти, затверджені Наказом Міністерства освіти і науки України від 01 червня 2016 р.

№ 600 (зі змінами) [Електронний ресурс]. – режим доступу: https://mon.gov.ua/ua/news/usi-novivni-povidomlennya-2016-06-01-metodichnirekomendacziyi-shhodo-rozroblennya-stand

5. Розроблення освітніх програм. Методичні рекомендації [Режим доступу: http://ihed.org.ua/images/doc/04 2016 rozroblennya osv program 2014 tempusoffice.pdf|:
6. Національний освітній глосарій: вища освіта [Режим доступу: http:// ihed.org.ua/images/doc/04_2016_glossariy Visha osvita 2014_tempusoffice.pdf];
7. Розвиток системи забезпечення якості вищої освіти в Україні: інформаційно-аналітичний огляд [Режим доступу: http://ihed.org.ua/images/ doc/04_2016_Rozvitok sisitemi zabesp yakosti VO UA 2015.pdf]; 12
8. Європейська кредитна трансферна накопичувальна система:. Довідник користувача [Режим доступу: http://ihed.org.ua/images/doc/04_2016_ECTS_Users Guide-2015 Ukrainian.pdf].
9. EQF-LLL - European Qualifications Frameworkfor Lifelong Learning [Режим доступу:https://ec.europa.eu/ploteus/sites/eac-eqf/files/brochexp_en.pdf];
10. QF-EHEA - Qualification Framework of the European Higher Education Area [Режим доступу:http://www,ehea.info/article-details.aspx?ArticleId=67];
11. Рашкевич Ю.М. Болонський процес та нова парадигма вищої освіти. - Львів: Видавництво Львівської політехніки, 2014 - 168 с. URL: http://erasmusplus.org.ua/korysna-informatsiia/korysni-materialy/category/3-materialy-natsionalnoi-komandy-ekspertiv-shchodo-zaprovadzhenniainstrumentiv-bolonskoho-protsesu.html?download=82:bolonskyi-protses-novaparadyhma-vyshchoi-osvity-yu-rashkevych&start=80
12. TUNING (для ознайомлення зі спеціальними (фаховими) компетентностями та прикладами стандартів