MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

NATIONAL TECHNICAL UNIVERSITY
"KHARKIV POLYTECHNIC INSTITUTE"

APPROVED
Rector of the NTU "KhPI"
_____ Evhen SOKOL
«24» «____05___» 2024 year

EDUCATIONAL AND PROFESSIONAL PROGRAM

«MODERN PROGRAMMING, MOBILE DEVICES
AND COMPUTER GAMES»

Second higher education level
Specialty –123 Computer engineering
Branch of knowledge –12 information technologies
Qualification – Master of Computer Engineering

APPROVED
by the Academic Council of the NTU "KhPI"
_____ Leonid TOVAZHNYANSKYY

(protocol №_4_ from "26" 04 2024 year)

Kharkiv 2024

CERTIFICATE OF APPROVAL
Educational and professional program

Higher Education LevelSecond (Master)

Branch of Knowledge12 Information Technologies

Specialty123 Computer Engineering

QualificationsMaster of Computer Engineering

APPROVEDRECOMMENDED

Head of the Support Group Methodical Council of the NTU "KhPI"

for the specialty Computer EngineeringDeputy Chairman of the Methodical Council

_____ Svitlana GAVRILENKO_____Ryslan MYGOUSHCHENKO

«___» _____ 2024 «___» _____ 2024

AGREEDAGREED

Head of Department of Computer EngineeringDirector of Educational and Scientific Institute of Computer Sciences **and Programming** and Information Technologies

_____ Oleksandr ZAKOVOROTNYI_____Mykhailo HODLEVSKYI

«___» _____ 2024 «____» _____ 2024

AGREED

Student of the group KN-M923b

(member of the OP working group)

_____ Dmytro Yampolskyi

«___» _____ 2024

REVIEWERS:

Productive comments and feedback on the draft educational and professional program (EPP) were received from:

1. Andriy KOVALENKO, Kharkiv National University of Radio Electronics, Head of the Computer Electronics Department.

2. Serhii ROZHOK, General Director of EPAM SYSTEMS LLC.

3. Vyacheslav ALEKSYEV, professor of the Department of Cyber Security, Pedagogical University named the National Education Commission, Krakow, Poland.

4. Oksana SEVRYUKOVA, GlobalLogic Co-ordinator, L&D

FOREWORD

The educational and professional program meets the standard of higher education in the specialty 123 "Computer Engineering" for the second (master's) level of higher education, approved and put into effect by the order of the Ministry of Education and Science of Ukraine dated March 18, 2021 No. 330 (123 Computer engineering).

Developed by the working group of the educational and professional program "Modern programming, mobile devices and computer games" of the Educational and Scientific Institute of Computer Sciences and Information Technologies of the National Technical University "Kharkiv Polytechnic Institute" in the composition of:

Guarantor of the educational program

Svitlana GAVRYLENKO, doctor of technical sciences, professor, professor of the department of computer engineering and programming.

Members of the working group of the educational and professional program:

1. Anatoly POVOROZNYUK, doctor of technical sciences, professor, professor of the department of computer engineering and programming.
2. Hanna FILATOVA, doctor of technical sciences, professor, professor of the department of computer engineering and programming.
3. Dmytro YAMPOLSKY, student of group KN-M923b.

The educational and professional program was discussed after receiving wishes and proposals from students, graduates, scientific and pedagogical workers, stakeholders and was approved at a meeting of the "Computer Engineering and Programming" department (protocol No. 11 dated April 22, 2024).

1. PROFILE OF EDUCATIONAL PROGRAMS FOR SPECIALTIES

1 – GENERAL INFORMATION	
HIGHER EDUCATIONAL INSTITUTION AND STRUCTURAL DEVELOPMENT	National technical university "Kharkiv Polytechnic Institute", Educational and Scientific Institute of Computer Science and Information Technologies, Department of Computer Engineering and Programming
THE LEVEL OF GREATER AWARENESS AND THE NAME OF THE QUALIFICATION, ON ORIGINAL LANGUAGE	Master. Master's degree in computer engineering.
OFFICIAL NAME OF THE EDUCATIONAL PROGRAM	Educational and professional program «Modern programming, mobile devices and computer games»
TYPE OF DIPLOMA AND OBLIGATORY EDUCATIONAL PROGRAM	Master's degree, single, 90 ECTS credits, 1 term 4 months
AVAILABILITY OF ACCREDITATION	Certificate of accreditation: ND series No. 2192135 Ministry of Education and Science of Ukraine. Term: until 1st month of 2025.
CYCLE/LEVEL	NRC of Ukraine - 7th level, FQ-ENEA - another cycle, EQF-LL - 7th level
PRECONDITION	The presence of the first (bachelor's) level of high education
TEACHING LANGUAGE	Ukrainian language, for foreigners – English
TERM FOR EDUCATIONAL PROGRAMS	Complies with the term of the certificate The educational program looks at each other sadly.
POSSIBILITY TO GROW UP THE DESCRIPTION OF EDUCATIONAL PROGRAMS	https :// blogs . kpi . kharkov . ua / v 2/ qual 1 ty / dokumenty / diyuchy - osvitni - programy / osvitnij - riven - magistr /
2 – PURPOSE OF THE EDUCATIONAL PROGRAM	
Preparation of master's degrees, which transfers obtainingcompetencies necessary for the development of professional skills in a warehouse team, which is sufficient for generating new ideas, solving scientific problems in the field of information technologies, storing data and research activities based on methods of piece intelligence, decision making systems, design and programming of computers 'European systems and networks, mobile devices and computer games, robotics, design of unmanned systems, advanced scientific methodology activities, the results of which represent scientific novelty, are of both theoretical and practical significance.	
3 – CHARACTERISTICS OF THE EDUCATIONAL PROGRAM	
SUBJECT AREA (KNOWLEDGE,	**Branch of Knowledge** – 12 Information Technologies

SPECIALTY, SPECIALIZATION)	**Specialty** – 123 Computer Engineering **Objects of study:** – software and technical features of computers and computer systems of universal and special purpose, including stationary, mobile, built-in, distributed; local, global computer networks, Internet speeches. – system and application software; interfaces and protocols for interaction of their components . – information processes, technologies, methods, methods and systems of automated and automatic design; design documentation, standards, procedures and methods of supporting the life cycle of specified software and hardware, methods and methods of processing information and data protection, mathematical models of computational processes, computer science technologies number, including highly productive, parallel, split, mobile, web-based that gloomy ones. **objectives:** training of facists who will handle complex tasks of a pre-study and innovative nature in the field of computer engineering and data protection, ensuring steel development IT industry, ensure the development, promotion and support of technical and software features of specialized computer systems and measures. **Theoretical location of the subject area:** scientific and theoretical, professional and research-innovative activities in computer engineering, concepts, concepts, principles, methods, software and technical features and technologies created, use and servicing of specialized computer systems and measurements, implementation and calculation of divisions. **Methods, techniques and technologies:** basic scientific methods of knowledge and research activities, technologies for automated design of software and hardware features of computer systems and their components, methods of mathematical and computer modeling, information Modern technologies, technologies for the development of system software security and data protection, intermediate technologies , mobile and mobile calculations, methods of intelligent data processing. **Tools and equipment:** daily computers and information systems and measurements, design automation systems, equipment necessary for monitoring the functioning and support of information and telecommunications Other systems and measures, systems, devices, equipment for ensuring the security of information. Operating systems, system and application software, stagnation of bad calculations and Internet speeches, etc.
ORIENTATION EDUCATIONAL PROGRAMS	**The orientation of educational programs** is education - professional. Level of education – master. The structure of the program transfers to various education and professional warehouses. *Theoretical exchange of the subject area* with concepts, concepts, principles, methods, software and technical methods and technologies of research, design, development, maintenance and development of functions within the framework of professional objects activities to ensure the availability of core competencies for the selected specialization. Types of professional activities that graduates who

	have completed the master's program are preparing for: scientific research; design and technological; vibration-technological; operational, organizational and management; initially methodical, innovative. **Scientific research.** Conducting scientific research to analyze trends in the development of hardware and software features of current computer and information systems and the characteristics of their modeling with a view to promoting innovative projects. **Design - technological.** Design and development of specialized hardware and mobile devices. Creation of application programs of various importance, system programs for modernization of basic software, development of systems based on client-server technologies. **Organization and management.** Organization and security of professional activities in the team, security of safety equipment, provision of social protection for workers, organization of cooperation with companies operating in the sphere IT technologies, formation of the team and its care, formation and development of organizational culture, organization of investment activities of the enterprise. **Educational and methodical.** Expansion with methods and techniques of pedagogical mastery, development of initial methodological support, development of pedagogical techniques and technology.
MAIN FOCUS OF THE EDUCATIONAL PROGRAM AND THE SPECIALIZATIONS	The main goal of the professional activities for masters in information technology with a specialization in "Computer Engineering" is aimed at: – software and technical devices (hardware, software), system and application software for computers and computer systems of universal and special purpose, including stationary, mobile, office, distributed; local, global computer interfaces and protocols for the interaction of their components; – information processes, technologies, methods and systems of automated and automatic design; development, development and operation, design documentation, standards, procedures and methods of supporting the life cycle of the specified software and technical features; – methods of processing Big Data, methods Artificial Intelligent and Machine Learning, mathematical models of computing processes and computer games, digital computing technologies, including highly productive, parallel, distributed, mobile, web-based and energy-efficient, secure, autonomous, adaptive, ectual; architecture and organization of functioning of various software and technical features. **Key words:** *computer systems and measures, software and hardware, system and application software, information processes, data processing, mathematical models* .
FEATURES PROGRAMS	The program will ensure the formation and development of underground and professional competencies from the promotion and development of promising areas of computer engineering, science, promising methods of analysis and synthesis of software and hardware features of current computer systems, as well as information technologies analysis of information and computational processes,

	which to ensure the social stability and mobility of graduates on the market, the ability to solve specialized problems and practical problems in the field of information technology. The implementation of the program transfers the integration of innovative developments to the scientific schools of the department: "Modeling and management of foldable technical objects", "Intelligent systems for supporting decision making when carrying out Diagnostically -recreational approaches", "Methods for processing and protecting information in computer systems", and the implementation of their lighting components. Preparation of highly qualified facists at a high methodical and professional level.
4 – GRADUATES' EMPLOYMENT APPLICABILITYAND FURTHER TRAINING	
GRADUATES' EMPLOYMENT APPLICABILITY	Graduates can work in the following professions (according to the National Classifier of Professions DK 003:2010): 2 Professionals 21 Professionals in the field of physical, mathematical and technical sciences 213 Professionals in the field calculation (computerization) 2131 Professionals in the field of computing systems 2131.1 Science and technology (calculation systems) https://kodeksy.com.ua/buh/kp/21311.htm 2131.2 Retailers of computing systems https://kodeksy.com.ua/buh/kp/21312.htm 2 132 Professionals in the programming field 2132.1 Sciences employees (programming) https://kodeksy.com.ua/buh/kp/21321.htm 2132.2 Retailers of computer software https://kodeksy.com.ua/buh/kp/21322.htm 2139 Professionals in other fields counting (computerization) 2139.2 Professionals in other fields count https://kodeksy.com.ua/buh/kp/21392.htm Here's information (https://minfin.com.ua/ua/2023/12/20/118205352/) based on tracking trends in the development of the market in 2024, the rise of respect for the profession of software developer, project manager, web designer, SEO - specialist, information security analyst.
FURTHER TRAINING	The possibility of continuing to study beyond the third (educational -scientific) level of education at the Western Military District of Ukraine and beyond the cordon for obtaining the degree Doctor of Philosophy. The beginning of life for development and self-improvement in scientific and professional fields of activity, as well as in other controversial areas of scientific knowledge .
5 – TEACHING AND ASSESSMENT	
TEACHING AND TRAINING	Student-centered training, which is carried out in the form of lectures, seminars, practical and laboratory classes, consultations, trainings, independent learning, course projects, developmental assignments, pre-graduate practice, and qualification preparation ï work based on the study of assistants, collaborators, periodical scientific publications, and research materials Internet; participation

	in scientific conferences, symposiums, Olympiads and competitions; using for information; publication of conference proceedings and scientific articles. Independent work has been provided with the possibility of consultation with a contribution for other educational components, individual lessons, and group project work.
ASSESSMENT	The educational program is monitoring knowledge. Current control – sleep ta letter testing , assessment robots in the little groups, control and individual work, testing, protection of data from laboratory and departments, course project, practice, etc., speaking at conferences and symposiums, protection group and individual scientifically - up to date task. Sovereign certification - preparation and public presentation graduation qualified master's thesis. A rating system of assessment has been introduced, whereby the assessment of the initial achievements of students is based on a national scale (excellent, kind, satisfactory, unsatisfactory; insured, uninsured); 100-point scale and ECTS scale (A, B, C, D, E, FX, F). Obviously, in order to recognize the results obtained from informal and/or informal education at NTU “KhPI”, the removal of the charge can be often or fully insured from the view of points for practicality more laboratory work.
6 – SOFTWARE COMPETENCIES	
INTEGRAL COMPETENCE	The ability to solve complex problems and problems in the field of computer engineering or in the process of training, which involves research and/or innovation and is characterized by uncertainty of conditions and requirements.
GENERAL COMPETENCES (SPECIALTIES DEFINED BY THE STANDARD OF HIGHER EDUCATION)	GC 1. Presence before adaptation and action in a new situation. GC 2. Presence of abstract thought, analysis and synthesis. GC 3. It is necessary to carry out investigations on a responsible level. GC4. Data availability, compilation and analysis of information from various sources . GC 5. The ability to generate new ideas (creativity). GC 6. It is important to identify, pose and solve problems. GC 7. It is important to accept the grounded solutions. GC 8. Reality is filled with foreign mine.
SPECIAL COMPETENCIES SPECIALTIES (SPECIALTIES DEFINED BY THE STANDARD OF HIGHER EDUCATION)	SC 1. Relevance to the importance of technical characteristics, design features, installation and operation of software, software and hardware, computer systems and other functions. SC 2. The important of developing algorithmic and software programs, components of computer systems and systems, Internet accessories, cyberphysical systems with various current methods and programs of programming, as well as features and design automation systems. SC 3. The important of designing computer systems and measures with regard to goals, boundaries, technical, economic and legal aspects. SC 4. Models of computer systems and measurements will be available and monitored. SC 5. This will include the architecture and creation of systemic and

	applied software for the security of computer systems and measures. SC 6. The important of promoting new technologies, including smart, mobile, green and secure computing technologies, and participating in the modernization and reconstruction of computer systems and various applications and developments lazy additives, based on the method of increasing their effectiveness. SC 7. It is important to investigate, expand and acquire technologies for the creation of great and super-great systems. SC 8. The need to ensure the integrity of information technology products and services throughout their life cycle. SC 9. The data represents the results of authoritative research and/or developments in the appearance of presentations, scientific and technical reports, articles and presentations at scientific and technical conferences. SC 10. It is important to identify, classify and describe the operation of software and hardware, computer systems, and their components. SC 11. The importance of developing effective methods for solving complex computer engineering problems, critically evaluating the results and justifying the decisions made. SC 12. The importance of developing, collecting and researching methods, models and information technologies for intelligent data analysis – data mining (including great ones), to ensure the efficiency of making project decisions.
7 – LEARNING OUTCOMES OF EDUCATION	
LEARNING OUTCOMES OF EDUCATION FOR THE SPECIALTY - (SPECIALTIES DEFINED BY THE STANDARD OF HIGHER EDUCATION)	LO 1. To combine advanced approaches to knowledge, methods of mathematics, natural sciences and engineering sciences to solving complex problems of computer engineering. LO 2. Find the necessary data, analyze and evaluate it. LO 3. Models of computer systems will be monitored and measured, evaluated their adequacy, to designate between stagnation. LO 4. Establish specialized conceptual knowledge, which includes current scientific developments in the field of computer engineering, necessary for professional activities, original research and critical research, understanding the problems of information technologies and knowledge between the fields. LO 5. Develop and implement projects in the field of computer engineering and related interdisciplinary projects with respect to engineering, social, economic, legal and other aspects. LO 6. Analyze the problem, identify and formulate specific problems that require improvement, and select effective methods for their improvement. LO 7. Determine the tasks of analysis and synthesis of computer systems and measurement. LO 8. To acquire knowledge of the technical characteristics, design features, meaning and operating rules of software and technical features of computer systems and the ability to solve complex problems of computer engineering and other problems. LO 9. Develop security software for built-in and distributed stationary, mobile and hybrid systems. LO 10. Search for information in various ways to solve computer engineering problems, analyze and evaluate this information.

	LO 11. Adopt effective solutions for the disaggregation, maintenance and operation of computer systems and networks, analyze alternatives, evaluate risks and global solutions . LO 12. It is advisable to use fluent and written Ukrainian language and one of the foreign languages (English, German, Italian, French, Spanish) when discussing professional nutrition, research and innovations in the field of information technologies. LO 13. Clearly and unequivocally convey the authoritative knowledge, foundations and arguments about the nutrition of information technologies LO 14. Expand and explore mathematical models and methods for intelligent data analysis (including Big data), algorithms and programs for their implementation .
8 – RESOURCE PROVISION FOR PROGRAM IMPLEMENTATION	
STAFFING	Educational program staffing is confirmed by the resolution of the Cabinet of Ministers of Ukraine dated December 30, 2015. No. 1187 "On the approval of licensed minds to promote the illumination activities of illumination deposits" (with changes introduced under the Cabinet of Ministers Resolution No. 365 dated March 24, 2021. Addendum 15-16). There are 10 doctors of technical sciences at the departments with the specialty "Computer Engineering". The same applies to the participation of scientists and representatives of IT companies.
MATERIAL AND TECHNICAL SUPPLY	The material and technical support of the educational programs is confirmed by the resolution of the Cabinet of Ministers of Ukraine dated December 30, 2015. No. 1187 "On the approval of licensed minds to promote the illumination activities of illumination deposits" (with changes introduced under the Cabinet of Ministers Resolution No. 365 dated March 24, 2021 Addendum 17). NTU "KhPI" has initial audiences, which allow students to participate in the program. In the current process, the computer technology of the departments is being developed, which satisfies the benefits for the quantity and capacity. Laboratory work, coursework and diploma thesis are carried out in computer laboratories run by IT companies – NIX Solution, EPAM, GlobalLogic, which are equipped with the latest technical and software security.
INFORMATION AND INITIAL-	Information and initially methodical provision of educational programs is confirmed by the resolution of the Cabinet of Ministers of Ukraine dated December 30, 2015. No. 1187 "On the approval of

METHODOLOGICAL SUPPLY	licensed minds to promote the illumination activities of illumination deposits" (with changes introduced under the Cabinet of Ministers Resolution No. 365 dated March 24, 2021. Addendum 18). The main documents that specify the place of study are the documents that are stored on the department's website. Methodically, the provision of initial disciplines (educational components) is divided into contributions of disciplines and stored in the repository of the scientific library of NTU "KhPI". The university's scientific library and departments, which conduct training for the program, produce basic literature (handbooks, methodological guides, monographs) and periodical publications that are researched for publication and development. Most information is available to students physically or on the Internet. The latest set of initial-methodological support for elementary disciplines is stored in paper and electronic form at the department.
9 – ACADEMIC MOBILITY	
NATIONAL CREDIT MOBILITY	On the basis of bilateral agreements between the National Technical University "Kharkiv Polytechnic Institute" and other initial deposits of Ukraine.
INTERNATIONAL CREDIT MOBILITY	Possibility laying down please about academic mobility and double diplomacy are regulated by the "Regulations on Education" students and internship (scientific internship) of graduate students, doctoral students, scientific and scientific-pedagogical practitioners of NTU «KhPI» among conducting higher education institutions and scientific installations beyond the cordon". Individual requests for academic mobility are allowed for the initiation and conduct of research in universities and scientific institutions of partner countries. Possibility of participation credit mobility programs (exchange, summer school) Fulbright, DAAD, TEMPUS, ERASMUS. Fate in the project Wildau-Kharkiv IT Bridge programs DAAD «Digital Ukraine: Ensuring Academic Success in Crisis ».
THE BEGINNING OF FOREIGN EDUCATION	The studies of foreign students are carried out in the best possible way in the English language (or in the Ukrainian language, as the student receives a senior certificate).

OVERVIEW OF EDUCATIONAL COMPONENTS OF EDUCATION AND PROFESSIONAL PROGRAMS AND THEIR LOGICAL SEQUENCE

Code n/a	Components of the educational program (disciplines, projects/works, practice, qualified work)	Number of credits	Pouch control form
1	2	3	4
1. Required educational components of EPP (applicants – Ukrainian citizens and foreigners)			
1.1 External preparation			
RC 1	Intellectual power	3	test
RC 2	Foreign language for professional directives	3	test
RC 3	Innovation and management startup projects	3	test
1.2 Special preparation			
RC1	Current technologies for oven-free programming	5	exam
RC2	Set up algorithms to make decisions	5	exam
RC3	Optimization of processes in multi-service systems and networks	5	exam
RC4	Programming for global measurements	6	exam
RC5	Fundamentals of neurocomputing	5	exam
RC6	Fundamentals of scientific research	5	exam
2. Practical preparation			
PP1	Pre- graduation practice	15	test
3. Certification			
	Certification	10	presentation
	Advanced training of obligatory components, practical training and certification	**62**	
4. Selected Educational Components (applicants – Ukrainian citizens and foreigners)			
4.1 Professional training			
4.1.1 Profiling package discipline 01 "Computer systems and networks "			
SEC1.1	Hardware features of local and global net	4	exam
SEC 1.2	Project microcontroller devices	4	exam
SEC 1.3	Design of corporate borders	4	exam
4.1.2 Profiling package of disciplines 02 “System programming”			
SEC 2.1	Programming for corporate meetings	4	exam
SEC 2.2	Theory of compilers	4	exam

1	2	3	4
SEC 2.3	Machine learning	4	exam
4.1.3 Profiling package of disciplines 03 “Specialized computer systems”			
SEC 3.1	Corporate security software	4	exam
SEC 3.2	Modeling and optimization of content computer games	4	exam
SEC 3.3	Methods for designing folding models dynamic objects	4	exam
	In total	12	
4.2 Disciplines of a free choice of professional training for transfer			
	Disciplines of the free choice of the student of specialized training	8	test
	Total sample volume components	**28**	
	TOTAL SAMPLE CELEBRATING EDUCATIONAL PROGRAMS	**90**	

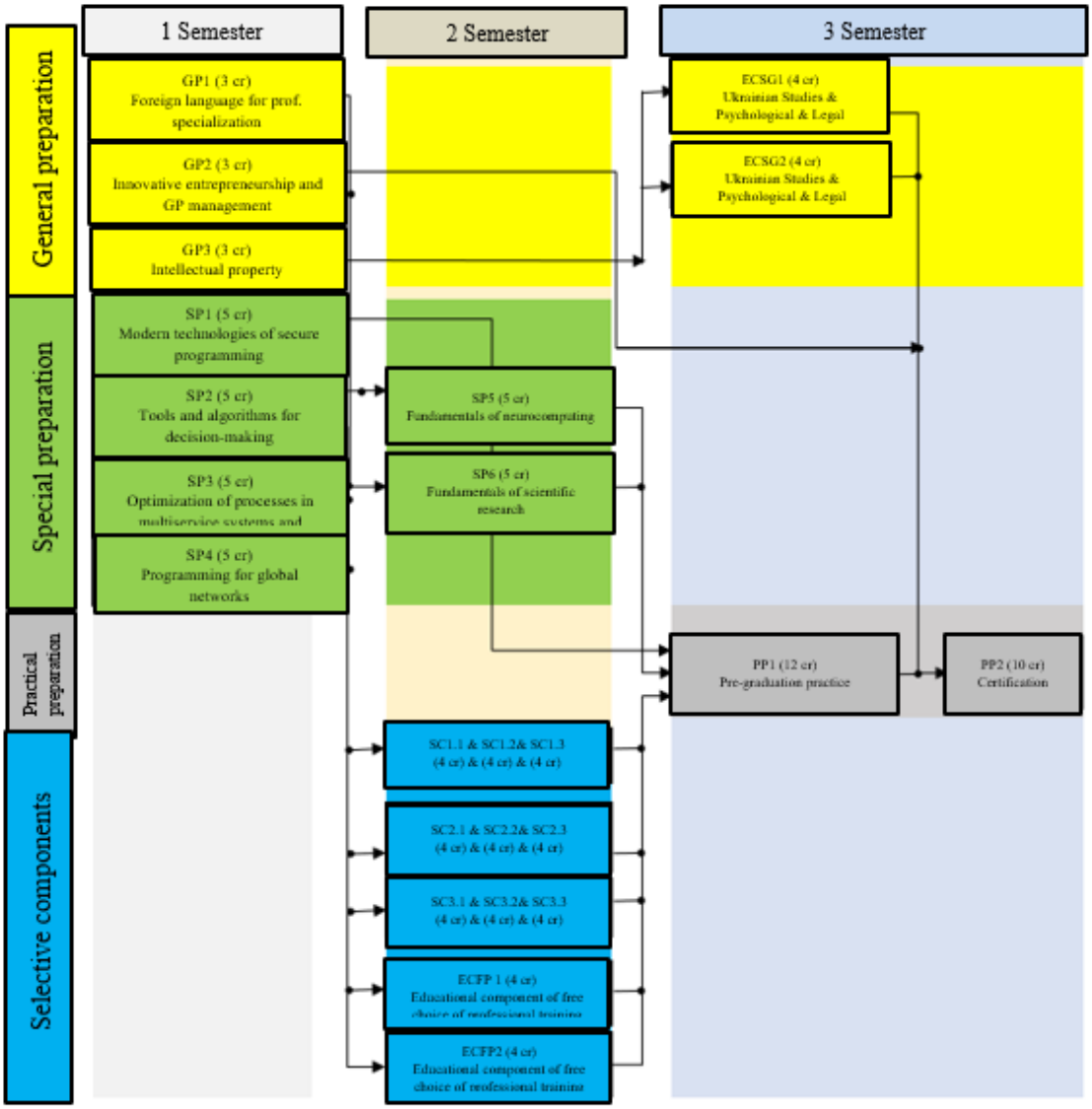
DISTRIBUTION OF CONTENT EDUCATION PROGRAMS FOR GROUPS OF COMPONENTS AND PREPARATION CYCLES

Item No.	Cycle preparations	The scope of the student's educational load Higher education (ECTS credits) / %)		
		Required components lighting - professional programs	Vibration components educational and professional programs	In total for the whole term training
1.1	General preparation	9 / 10,0	–	9 / 10,0
1.2	Special preparation	31 / 34,5	–	31 / 34,5
2	Practical preparation	12/13,3	–	12/13,3
3	Certification	10/11,1	–	10/11,1
4	Disciplines free choice	–	28 / 31,1	28 / 31,1
In total for the whole term training		62/68,9	**28** / 31,1	**90** / 100

FORM OF CERTIFICATION OF HIGHER EDUCATION APPLICANTS

CERTIFICATION FORMS FOR HIGHER EDUCATION APPLICANTS	Public presentation (demonstration) qualification thesis.
REQUIREMENTS OF CERTIFICATION OF HIGHER EDUCATION APPLICANTS	Qualification work is not independent of the student's project-based work, which conveys the author's problem, the possibility of research and development. Work to identify the author, conduct empirical research, develop transmission systems, evaluate design solutions , and analyze extract the results, formulate arguments. The number of graduates with qualifications may be in agreement: – systematization, consolidation and expansion of theoretical and practical knowledge of the specialty and consolidation of this knowledge for the development of specific tasks; – development of skills in independent work and advanced training methods nutrition and problems posed by graduate work; – assessment of the level of professional competence necessary for future professional activity. A qualified work is not guilty of revenge against academic plagiarism, fabrication, falsification. The qualified work may be confirmed by the repository of NTU “KhPI”.
REQUIREMENTS FOR QUALIFIED THESIS (AS AVAILABLE)	The introductionis made up of three semantic parts, which correspond to the place: the entry, the main part ta Basics of qualified work. At the entrance tell The relevance of the problem under investigation is revealed, the object, subject, purpose of investigation and investigation are formulated . The main part, above all, reveals the essence, methodology and features of the organization and conduct of research and development of qualified work. At the conclusions be guided The main results of research and development are of theoretical and practical significance taking away the results possible prospects for further research and developer. The assessment of the qualifications thesis is made by members of the examination committee in a closed meeting. The Commission takes care of the replacement of work, priming renewals, replacement of evidence, the quality of presentation of qualified work and testimonials for supply, introduction to work, the level of theoretical and practical preparation of the student. Evaluations of qualified work will be voted on the same day after the entire group has completed voting and has completed the protocol of the committee meeting . Based on the results of the student certification, the examination committee praises the decision to assign qualifications to the specialty and issue a master's degree.

STRUCTURAL AND LOGICAL SCHEME
EDUCATIONAL AND PROFESSIONAL PROGRAM



Correspondence matrix of learning outcomes and competences

	Learning outcomes	Competences																				
		Integral competence																				
		General competences (GC)								Special (professional) competences (SC)											SC *additional*	
		GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	SC9	SC10	SC11	SC *12*	
LO from the standard	LO 1	SC4 SC6	GC 2		GC 2	GC 2 SC 6					SC 5											
	LO 2		SC 3		GC 3						SC 1	SC 1	SC 3					SC 6	SC 1			
	LO 3			SC 5																		
	LO 4						SC 1												SC 1			
	LO 5							SC 4		SC 4	SC 4			СП 4								
	LO 6				GC 3 SC 2						SC 2											
	LO 7									SC 4	SC 4											
	LO 8		SC 3			SC 6							SC 3							SC 3 SC 6		
	LO 9									SC 4				SC 4	SC 4							
	LO 10												SC 3						SC 1			
	LO 11				SC 2										SC 2	SC 4	SC 2					
	LO 12								GC 1													
	LO 13			SC 6																		
LO additional	LO *14*																				SC 2 SC 5 SC 6	