

# **BORYS GRINCHENKO KYIV UNIVERSITY**

«APPROVED»

Decision of the Academic Council,  
Borys Grinchenko Kyiv University  
23 March 2017, Protocol No.3

The Head of the Academic Council, Rector  
**Viktor Ogneviuk**

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(підпис)

## **Programme of Study (Vocational) 122.00.01 Computer Science**

### **Level Two (Master) of higher education**

Field of Knowledge: 12 Information Technology  
Speciality: 122 Computer Science  
Qualifications: : Master of Computer Science

Enacted since 01 September 2017  
(Order No.347, since 26 May 2017)

**Kyiv – 2017**

**LETTER OF APPROVAL**  
**Programme of Study (Vocational)**

The Chair of Information Technologies and Mathematical Disciplines

Protocol No. 1, 10 January 2017

The Head of the Chair \_\_\_\_\_ Oksana Lytvyn

The Academic Council of the Faculty of Information Technology and Management

Protocol No 6, 15 March 2017

The Head of the Academic Council \_\_\_\_\_ Alla Mykhatska

The Head of the SMC of Standardization and Quality Education

\_\_\_\_\_ Olha Leontieva

\_\_\_\_.\_\_\_\_. 2017 p.

Vice-Rector on Academic Affairs

\_\_\_\_\_ Oleksii Zhylytsov

\_\_\_\_.\_\_\_\_. 2017 p.

SRL Education Internationalization

The Head \_\_\_\_\_ Olha Vyhovska

\_\_\_\_\_ 2017

Vice-Rector for Research

\_\_\_\_\_ Nataliia Vinnikova

\_\_\_\_.\_\_\_\_. 2017

## PREAMBLE

The educational-professional complies with the Law of Ukraine "On Higher Education" and the Draft of the Standard for Higher Education of Ukraine in the field of knowledge of specialty 122 Computer Science for Level Two (Master) of higher education by the project group:

*Oleksandr Bushma, PhD in Technical Sciences, Professor, Professor of the Chair of Information Technology and Mathematical disciplines*

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Iryna Mashkina, PhD in Technical Sciences, Associate Professor, Associate Professor of the Chair of Information Technology and Mathematical disciplines

Tetyana Nosenko PhD in Technical Sciences, Associate Professor, Associate Professor of the Chair of Information Technology and Mathematical disciplines

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### External Reviewers:

1. Valentyn Bahatskyu Олексійович, PhD in Technical Sciences Leading researcher at V.M. Glushkov Institute of Cybernetics of National Academy of Sciences of Ukraine
2. Mykhaylo Savchuk, PhD in Physical and Mathematical Sciences, Associate Professor, a.i. The Chair of Head of the Chair of Mathematical Methods of Information Protection at National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»

Implemented in 2017

Actualized:

Date of Review of the PS /Amendments to PS			
Signature			
PS Guarantor			

# I. PROFILE OF THE PROGRAMME OF STUDY (VOCATIONAL)

Computer Sciences

(Speciality: Information Systems Security / Social Informatics)

<b>1 - General information</b>	
<b>The full name of the higher education institution and the structural unit</b>	Borys Grinchenko Kyiv University Faculty of Information Technologies and Management
<b>Degree of higher education Educational qualification</b>	Master Master at Computer Sciences
<b>Official name of the programme of study</b>	122.00.01 Computer Science
<b>Type of diploma and term of study according to the programme</b>	90 credits ECTS Master degree, unitary term of study: 1 year 4 months
<b>Availability of accreditation</b>	Accredited in 2017
<b>Cycle / Level</b>	Level Two (Master) /Level 7 of the National Qualification Framework of Ukraine
<b>The education level required to commence study under the programme</b>	Level One (Bachelor) of higher education or specialist degree
<b>Language (s) of teaching</b>	Ukrainian
<b>Validity of the programme of study</b>	2022
<b>Internet address of the permanent placement of the description of the programme of study</b>	kubg.edu.ua/
<b>2 - The purpose of the programme of study (vocational)</b>	
To provide students with the fundamental theoretical and practical training for acquiring the ability to perform professional tasks and responsibilities of research and innovation in the fields of modern computer science, pedagogy and methodology of higher education, and the ability to independently carry out scientific and pedagogical activities.	
<b>3 - Characteristics of the programme of study</b>	
<b>Subject area</b>	<i>Objects of study and /or activity:</i> <ul style="list-style-type: none"><li>- principles of functioning, cooperation and development of large systems, methods for studying systems of varying complexity and purposes, practical recommendations for their use;</li><li>- principles and methods of modeling complex systems and processes, modern software products for constructing models of complex processes and systems; technologies of designing and managing information systems</li><li>- Principles, Models, Software Development Toolkits, Programming Methodology, Architecture, Principles of Configuration and Testing Software</li><li>- concepts of designing and constructing databases, basic model databases, database architecture, modern areas for the development of database technology, issues related to the operation of databases.</li><li>- philosophical problems of information and computer science in modern society, directions and prospects of the development of</li></ul>

	<p>informatics as a science</p> <ul style="list-style-type: none"> <li>- the regularities of the functioning of the psyche of the student as a subject of educational and professional activity, the specifics of the teacher's scientific and pedagogical activity, the teaching staff training of higher qualification, the forms of organization of educational and educational processes in higher educational institutions;</li> <li>- concepts, theories, methods and methodologies of teaching informatics disciplines in the system of higher education. <i>Цілі навчання:</i> формування у здобувачів вищої освіти розуміння фундаментальних проблем інформатики, комплексу знань, умінь та навичок для застосування у професійній діяльності у сфері комп'ютерних наук та інформаційних технологій, комп'ютерному моделюванні й проектуванні, системному аналізі та розв'язуванні прикладних задач.</li> </ul> <p><i>The theoretical content of the subject area is</i> basic concepts and concepts in software engineering; basic concepts and provisions of the theory of systems and methods of system analysis; modern models, methods, algorithms, technologies of designing and management of information systems and processes; conceptual issues at the intersection of computer science, computer science, information technology and philosophy; scientific and methodological problems of the development of informatics as a fundamental science; the concept of didactics, pedagogical technologies, laws and regularities of teaching pedagogical process in higher educational institutions, teaching methods of professional disciplines</p> <p><i>Methods, techniques and technologies:</i> methods of computer modeling, prediction of properties and behavior of mathematical models on the basis of empirical data; methodology of abstract thinking, analysis and synthesis; methods of scientific research; information, hardware, software and communication technologies.</p> <p><i>Instruments and equipment:</i> technology for modeling, designing, analyzing information systems, computer networks, cloud technologies, database management systems, operating systems, design environments and software development.</p> <p><i>The proportion of the volumes of the general and professional components and optional parts:</i></p> <ul style="list-style-type: none"> <li>- <u>Mandatory part (67 credits, 74.5%):</u></li> <li>- general and special (professional) competencies for the speciality (50 ECTS credits, 1500 hours, 2-nd year – practice hours)</li> <li>- cycle of pedagogical training disciplines (17 ECTS credits, 510 hours, 2-nd year – practice hours)</li> <li>optional part (Speciality) (23 credits, 25,5 %).</li> </ul> <p><i>Field practice share::</i> 24 ECTS credits (26,7 %)</p>
<p><b>Orientation of the programme of study</b></p>	<p>Educational and professional program with a choice of specialization: information systems security / social informatics.</p> <p>The program includes in-depth fundamental, psychological and pedagogical, special and scientific-practical training taking into account the current state of computer science, focuses on actual specialization, within which further professional and scientific careers are possible: informatics (theoretical and applied), information and communication technologies in education and the social sector, security of information systems.</p>
<p><b>The main focus of the programme of study</b></p>	<p>fundamental education in the field of "Computer Science"; psychological and pedagogical and methodical preparation for pedagogical activity at a high school. Additional specialization to choose from: Information Systems Security</p>

	/ Social Informatics
<b>Specific features of the programme</b>	<ul style="list-style-type: none"><li>- The program envisages two specialties of choice with the relevant practice;</li><li>- The program provides for theoretical and practical study of basic disciplines in the field of teaching methods in higher education (computer science), including production assistant practice.</li></ul>

#### 4 - Eligibility of graduates to employment and further studying

<b>Employment</b>	<p>Positions in educational institutions, research institutions, public and private institutions and non-governmental organizations: teacher of computer science disciplines, researcher, computer science consultant, programmer engineer, information security specialist, computer modeling specialist, forecast, optimization of social processes, design and implementation of modern databases, manager (assistant manager) of the enterprise (institution, organization).</p> <p>According to the National Classification of Professions ДК 003: 2010, specialists who have completed training according to the programme of study Computer Sciences may hold the following primary positions</p> <p>2131.2 Developers of computing systems                  2139.2 Information Technology Management Expert                  2310 Teacher of Universities and Higher Educational Institutions                  2149.2 Information Security Professional                  (specialization "Information Systems Security")                  2433.2 Professional in the field of information and information analytics                  (specialization "social informatics")</p>
<b>Further learning</b>	<p>Doctorate</p> <p>The learner with Master degree can continue training to get the third (educational and scientific) level of higher education, as well as improve qualifications and receive additional postgraduate education</p>

#### 5 – Teaching and assessment

<b>Teaching and learning</b>	Student-centered learning and individual-personality approach; are realized through studies based on research, strengthening of practical orientation and creative orientation in the form of a combination of lectures, practical classes, independent study and research work using the elements of distance learning, solving applied tasks, implementing projects, production practices, qualification master's work.
<b>Assessment</b>	Cumulative rating system, which involves student evaluation for all types of classroom and non-classroom educational activities: current, modular, final control; written examinations, testing, laboratory reports, presentations, credits, practice reports, qualification master's work.

#### 6 - Programme competencies

<b>Integral competence</b>	Ability to solve complex specialized problems and practical problems in the field of computer sciences or in the process of learning that involves the application of theories and methods of computer science, information technology and is characterized by complexity and uncertainty of the conditions.	
<b>General competencies</b>	<b>GC-1</b>	<b>Ability to solve complex problems.</b> Ability to reveal the scientific essence of problems in the professional sphere, to find adequate ways of their solution; the knowledge of a system, a holistic approach to the analysis and assessment of the situation
	<b>GC-2</b>	<b>Critical thinking.</b> Ability to analyze, verify, evaluate the completeness and reliability of information in the course of professional activity, if necessary, to supplement and synthesize missing information.
	<b>GC-3</b>	<b>Creativity.</b> Openness to new knowledge, ideas and technologies; the ability to produce non-standard ideas, approaches, deviate from traditional problem-solving schemes; ability to innovate.
	<b>GC-4</b>	<b>Staff management.</b> Ability to take initiative and carry out leadership functions in the team in order to achieve a common goal; ability to manage projects, organize team work, set goals, evaluate and ensure

	the effectiveness of teamwork; to manage the strategic development of the team in the process of professional activity.
<b>GC-5</b>	<b>Coordination with others.</b> Ability and willingness to carry out collective projects, assume responsibility for the work of a separate group; ability to conduct a discussion, arguing for his point of view; the ability to communicate their own knowledge, substantiation and conclusions to the specialists and the general public;
<b>GC-6</b>	<b>Conducting negotiations.</b> Ability to communicate in Ukrainian and foreign languages with representatives of other professional groups of different levels (with experts from other fields of knowledge / types of economic activity, customers, auditors of certification bodies, etc.); skills of effective use of modern communication technologies.
<b>GC-7</b>	<b>Emotional intelligence.</b> Understanding your own emotional state, self-control and self-regulation; self-esteem and confidence; ability to overcome difficulties, resistance to stress; general optimistic mood, initiative, adjustment to a positive result.
<b>GC-8</b>	<b>Cognitive Flexibility.</b> Ability to acquire new knowledge, skills and integrate them with existing ones; independent development of new methods of research, changes in the scientific and production profile of their activities.
<b>GC-9</b>	<b>Customer Orientated Approach.</b> Ability to communicate effectively with the customer, formulate a technical task, develop a plan for its implementation, present the results of work and substantiate the proposed solutions at the modern scientific, technical and professional level.
<b>GC-10</b>	<b>Making judgments and making decisions.</b> The ability to navigate in different perspectives on the problem, to form their own opinion; be able to formulate the task, reasonably choose the best ways to solve, analyze and comprehend the resulting solution.
<b>Professionals</b>	
<b>PC-1</b>	Ability to effectively realize itself as a specialist in computer science in the information society; evaluation, analysis and effective use of the methods, technologies and tools of informatics in all spheres of public life; understanding of the main directions of further development of informatics
<b>PC-2</b>	Ability to formulate and study mathematical models of systems and processes, substantiation of the choice of methods and approaches for solving theoretical and applied problems in the field of computer sciences, interpretation of the obtained results..
<b>PC-3</b>	Ability to develop adequate computer models and algorithms for solving professional problems with the use of modern technologies and tools (including according to the chosen specialization).
<b>PC-4</b>	Ability to organize computational processes and management in information systems of different purposes, taking into account their architecture, configuration, software and organizational structure (including in accordance with the chosen specialization).
<b>PC-5</b>	Ability to formulate and analyze database requirements based on goals and resources of the organization, conceptual, logical and physical design of the database with the definition and taking into account the criteria of optimality and the use of modern technologies.
<b>PC-6</b>	Ability to build computer software systems with the use of appropriate concepts, methods and means of programming, the use of technologies and tools for their support, measurement and evaluation of development quality.
<b>PC-7</b>	Ability to use the legislative and regulatory framework, as well as the requirements of relevant, including international, standards and



		practices for the pursuit of professional activities (including according to the chosen specialization).
	<b>PC-8</b>	To have a complex of knowledge, skills and other competencies (on psychology, pedagogy, professional disciplines, teaching methods, Ukrainian studies and ideological disciplines), which ensures the ability to organize and conduct qualitative studies and educational work in higher educational institutions
	<b>PC-9</b>	Ability to apply the latest educational technologies in professional activity, readiness and ability through self-education, studying positive experience to improve their pedagogical skills.
<b>Additional professional competences of the specializations</b>	<b>APCs-1</b>	<p><i>For the specialization "Security of Information Systems".</i> Ability to predict, detect and evaluate the state of information security of objects and systems; to carry out special researches of technical and software information protection in organizations; to carry out the design (development) of systems, technologies and means of information security, as well as to counteract unauthorized access to the system and network.</p> <p><i>For specialization "Social Informatics".</i> Ability to systematically analyze and predict economic, environmental and social processes; modeling, processing, structuring of information of complex social systems, decision-making in conditions of multi-factor uncertainties and risks, operation of significant volumes of information.</p>
<b>7 – Program learning outcomes</b>		
<b>Knowledge and understanding</b>	<b>PLO-1</b>	of science-learning conceptual apparatus, methodology, methods, forms of scientific research, requirements and rules of scientific publications, ethical aspects of scientific research;
	<b>PLO-2</b>	of historical development of computer science, current trends and current problems in computer science; ways of applying theoretical informatics and computational methods in philosophical problems;
	<b>PLO-3</b>	the basic notions and positions of the theory of systems; principles, methods, structure of system analysis; factors, operations, system analysis functions;
	<b>PLO-4</b>	existing methodologies, technologies and tools for modeling, analyzing, optimizing and forecasting processes in information systems and the principles of their rational use;
	<b>PLO-5</b>	concepts, methods, tools and tools used to design databases; basic models of databases, DBMS architecture, modern directions of development of database technologies; a method of performing calculations and criteria for evaluating alternative solutions at each stage of designing; information requirements as the source for the design process; means of describing the source data and displaying the results of each stage of the design.
	<b>PLO-6</b>	the main provisions of the life cycle, quality and management in accordance with the main software engineering standards; integration methods multi-lingual programs and approaches to their changes for new environments; engineering of production of application systems and their families from finished components; instrumental and technological means of collective production of software products in modern environments and the basics of their management and quality..
	<b>PLO-7</b>	composition, content and methods of development of methodological and normative documentation in the fields of professional activity (including in accordance with the chosen specialization), as well as concerning licensing, patenting and certification of information activities.

	<b>PLO-8</b>	the principles of didactics of teaching of professional disciplines, methods, methods and means of organizing students' educational activities, scientific, educational and organizational work at a higher educational institution.
	<b>PLO-9</b>	competent building of communication in the educational and scientific process, professional activity.
<b>Additional professional competences of the specializations</b>	<b>APCs-1</b>	<i>For the specialization "Security of Information Systems".</i> The basics of information security and risk theory at different levels of information processes; <i>For specialization "Social Informatics".</i> the main concepts of society's informatization, its influence on social processes, including the development and place of a person in society;
	<b>APCs-2</b>	<i>For the specialization "Security of Information Systems".</i> modern standards, technical, software, organizational methods and means of information protection in information and communication systems and networks; <i>For specialization "Social Informatics".</i> principles and means of collecting, systematizing, generalizing social information, technologies and tools of web analytics, Internet sociology, e-governance; main types of information resources and their role in the development of society;
<b>Application of knowledge and understanding</b>	<b>AKU-1</b>	to formulate and solve a research task, to collect, process and systematize information for its solution, to formulate conclusions, to publish the results of scientific research;
	<b>AKU-2</b>	effectively use modern mathematical apparatus in professional activity to solve problems of a theoretical and applied nature; design, develop and analyze models and algorithms of information processes in systems, evaluate their adequacy, efficiency, complexity, solvability;
	<b>AKU-3</b>	to develop software models of subject environments, to choose the programming paradigm from the point of view of convenience and quality of application for solving problems; to design programs and software systems with optimal solutions for the composition of software, algorithms of procedures and operations;
	<b>AKU-4</b>	to design conceptual, logical and physical models of databases, to develop and optimize their management systems;
	<b>AKU-5</b>	to choose and apply appropriate standard analytical, computational and experimental methods for solving professional problems, to interpret the results
	<b>AKU-6</b>	act on the basis of the legislative, regulatory and legal framework of Ukraine and the requirements of the relevant standards, including international ones; to prepare the relevant documentation in accordance with the requirements within the limits of the decision of professional tasks (including according to the chosen specialization);
	<b>AKU-7</b>	планувати викладання інформатичних дисциплін з використанням різних організаційних форм та засобів навчання, визначати функції, мету та задачі навчання у вищому навчальному закладі, готувати і проводити заняття різних типів та форм;
	<b>AKU-8</b>	створювати і використовувати дидактичні і методичні засоби, зокрема комп'ютерно-орієнтовані, здійснювати розробку комп'ютерних програм навчального призначення згідно з поставленим технічним завданням;
	<b>AKU-9</b>	to plan the teaching of informatics disciplines using various organizational forms and means of teaching, to define the functions, purpose and tasks of studying at a higher educational institution, to prepare and conduct classes of various types and forms;

	<b>AKU-10</b>	oral and written communication in native and foreign languages in the scientific, production and social-social spheres of professional activities.
<b>Additional professional competences of the specializations</b>	<b>APCs-1</b>	<i>For the specialization "Security of Information Systems".</i> to design and implement integrated information security systems of organizations (enterprises) in accordance with the requirements of the normative documents of the information security system; <i>For specialization "Social Informatics".</i> to develop, produce and use information resources and data banks for analysis and forecasting of the main directions of development of society, state, commercial and public institutions and organizations.
	<b>APCs-2</b>	<i>For the specialization "Security of Information Systems".</i> solve problems of software and data protection of information systems and networks by software and hardware and give an estimation of the quality of the decisions taken; <i>For specialization "Social Informatics".</i> create and operate information systems that ensure the functioning of government bodies in real time and their communication with citizens, legal entities, and non-governmental organizations.
<b>8 – Resource support for the implementation of the programme</b>		
<b>Personnel</b>	<p>Personnel of the educational program consists of the members of the Chair of information technology and mathematical disciplines of the Faculty of Information Technology and Management. By teaching particular subjects according to their competence and experience of the involved faculty of Kyiv National University of Taras Shevchenko, MP Drahomanov National Pedagogical University.</p> <p>The practice-oriented nature of the educational program involves a broad participation of practitioners who are in line with the program's direction, which enhances synergy between theoretical and practical training.</p> <p>The head of the project team and the teaching staff, which ensures its implementation, meets the requirements specified by the Licensing Conditions for conducting educational activities of educational institutions.</p>	
<b>Material and technical support</b>	Computer classes and competence centers are specially equipped with hardware software, visual and methodological materials, namely: the laboratory of embedded systems and 3D modeling, the center of modeling and programming, the center of educational technologies, the computer laboratory networks	
<b>Information, educational and methodological support</b>	Library electronic resources, electronic scientific editions, electronic training courses with the possibility of distance learning and independent work, cloud services.	
<b>9 - Academic mobility</b>		
<b>National Credit Mobility</b>		
<b>International Credit Mobility</b>	<p>The Regulations on the procedure for exercising the right to academic mobility of the participants of the educational process of the University were put into effect by order dated September 30, 2016. Agreements were envisaged that stipulate student mobility with universities of European countries and within the framework of the Erasmus + CA1 program. Among them are the University of Vilnius (Lithuania), the University of Constantine Philosopher in Nitra (Slovakia), the University of Extremadura (Spain), the Silesian University in Katowice (Poland), the Jan Długosz Academy in Częstochowa (Poland), the University of Ostrava (Czech Republic), the University of Lisbon University of Cork (Portugal) and others</p>	
<b>Studying of foreign higher</b>	According to the license, preparation of foreigners and stateless persons is	

<b>education learners</b>	envisaged
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## II. The List of the Components of the Programme of Study (vocational) Social Communications and Their Logical Coherence

Component Code	Components of the Programme of Study (academic discipline, practice, degree paper))	Credits ECTS	The Form of the Final Control
1	2	3	4
<b>Professional competencies</b>			
<b>I. Compulsory components of PS</b>			
<b>1. Educational disciplines</b>			
ОДФ.01	Foreign language of the specialization	5	credit
ОДФ.02	Theory of systems and system analysis	4	exam
ОДФ.03	Software Engineering	4	exam
ОДФ.04	Methodology for designing modern databases	5	exam
ОДФ.05	Simulation of systems and processes	5	exam
ОДФ.06	Philosophy of Information and Fundamental Problems of Informatics	4	credit
ОДФ.07	Licensing, Patenting and Certification of Information Activities	4	credit
ОДФ.08	Technologies of designing and managing information systems	4	exam
ОДФ.09	Pedagogy and Psychology of Higher School	4	credit
ОДФ.10	Methodology of teaching of professional disciplines	4	exam
<i>Total amount of the compulsory components:</i>		43	-
<b>2. Practice</b>			
ОП.01	Internship	9	credit
ОП.02	Pre-diploma practice	9	credit
<i>Total amount of practice</i>		18	-
<b>3. Attestation</b>			
ОА.1	Preparation of Master Degree Paper	4,5	
	Master Degree Paper Defense	1,5	
<b>Total amount of the compulsory components:</b>		<b>67</b>	
<b>II. Optional components of EP</b>			
<i>Optional components 1 (Specialization "Information Systems Security")</i>			
ВДС.1.01	Methods of implementing cryptographic mechanisms	4	exam
ВДС.1.02	Information security of the organization	13	exam, credit
ВП.1.01	Industrial practice in specialization	6	credit
<i>Total on the specialization</i>		23	
<i>Optional components 2 (Specialization "Social Informatics")</i>			
ВДС.2.01	Prediction of social processes	5	exam
ВДС.2.02	Social Informatics	7	exam
ВДС.2.03	E-governance	5	credit
ВП.2.02	Industrial practice in specialization	6	credit
<i>Total on the specialization</i>		23	
<b>Total amount of the optional components</b>		<b>23</b>	
<b>TOTAL AMOUNT OF THE PROGRAMME OF STUDY</b>		<b>90</b>	

2.1 Structural Logical Scheme of the Programme of Study  
(Vocational) Social Communications

Year of study 1		Year of study 2
Semester 1	Semester 2	Semester 3
Foreign language of the specialization 5 credits ECTS	Philosophy of Information and Fundamental Problems of Informatics 4 credits ECTS	Internship 9 credits ECTS
Theory of systems and system analysis 4 credits ECTS	Technologies of designing and managing information systems 4 credits ECTS	Pre-diploma practice 9 credits ECTS
Simulation of systems and processes 4 credits ECTS	Licensing, Patenting and Certification of Information Activities 4 credits ECTS	
Software Engineering 4 credits ECTS	Pedagogy and Psychology of Higher School 4 credits ECTS	
Methodology for designing modern databases 5 credits ECTS	Methodology of teaching mathematical disciplines 4 credits ECTS	
<b>Specialization</b>		
<b>Information Systems Security</b>		
Methods of implementing cryptographic mechanisms 4 credits ECTS		Industrial practice in specialization 6 credits ECTS
Information security of the organization 13 credits ECTS		
<b>Social Informatics</b>		
Prediction of social processes 5 credits ECTS	E-governance 5 credits ECTS	Industrial practice in specialization 6 credits ECTS
Social Informatics 2 credits ECTS		5 credits ECTS
	Preparation of Master Degree Paper 4, 5 credits ECTS	Attestation 1,5 credits ECTS Master Degree Paper Defense

### **III. Form of Attestation of Higher Educational Learners**

The graduate students majoring in Speciality 122 "Computer Science" get attestation in the form of degree paper defense and they are given the document of the state standard issued to confirm that they are awarded with the degree and education qualification of Master of Computer Science

The attestation is performed openly and publicly.

#### IV. Matrix of the Programme Competence Compliance with the Programme Components

	ОДФ.01	ОДФ.02	ОДФ.03	ОДФ.04	ОДФ.05	ОДФ.06	ОДФ.07	ОДФ.08	ОДФ.09	ОДФ.10	ОА.1	ВДС.1.01	ВДС.1.02	ВДС.2.01	ВДС.2.02	ВДС.2.03
GC1		+	+		+	+		+	+	+	+	+	+	+		
GC2		+				+					+		+		+	
GC3	+	+	+	+		+		+		+	+		+		+	+
GC4			+					+	+				+	+		+
GC5	+		+	+				+	+							
GC6	+					+							+			+
GC7									+							
GC8		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC9	+						+	+					+			+
GC10		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PC1		+	+	+	+	+	+	+	+	+		+	+	+	+	+
PC2		+			+			+			+	+		+		
PC3			+	+				+				+	+	+		+
PC4				+				+			+		+		+	+
PC5				+									+		+	+
PC6			+				+				+					
PC7							+				+		+		+	+
PC8									+	+	+					
PC9									+	+						
APCs-1												+	+	+	+	+

GC – general competences, PC – professional competence, APCs - Additional professional competences of the specializations

#### V. Matrix of Providing Programme Learning Outcomes with the Relevant Programme Components

	ОДФ.01	ОДФ.02	ОДФ.03	ОДФ.04	ОДФ.05	ОДФ.06	ОДФ.07	ОДФ.08	ОДФ.09	ОДФ.10	ОА.1	ВДС.1.01	ВДС.1.02	ВДС.2.01	ВДС.2.02	ВДС.2.03
PLO-1						+					+					
PLO-2						+					+					
PLO-3		+									+					



	ОДФ.01	ОДФ.02	ОДФ.03	ОДФ.04	ОДФ.05	ОДФ.06	ОДФ.07	ОДФ.08	ОДФ.09	ОДФ.10	ОА.1	ВДС.1.01	ВДС.1.02	ВДС.2.01	ВДС.2.02	ВДС.2.03
PLO-4					+						+					
PLO-5				+				+			+	+	+	+	+	+
PLO-6			+				+				+					
PLO-7							+				+		+		+	+
PLO-8									+	+	+					
PLO-9	+								+	+	+					
APCs-1												+		+	+	
APCs-2													+		+	+
AKU-1						+					+					
AKU-2		+		+			+				+					
AKU-3			+								+					
AKU-4				+							+					
AKU-5			+	+	+	+			+		+		+		+	+
AKU-6							+	+			+		+		+	+
AKU-7									+	+	+					
AKU-8									+	+	+					
AKU-9									+	+						
AKU-10	+									+	+					
APCs-1												+	+	+	+	+
APCs-2													+		+	+

PLO - Program learning outcomes, APCs - Additional professional competences of the specializations, AKU - Application of knowledge and understanding