BORYS GRINCHENKO KYIV UNIVERSITY

«APPROVED»

Decision of the Academic Council,
Borys Grinchenko Kyiv University
27 August 2020, Protocol No.7
(**new edition**)

The Head of the Academic Council, Rector
Viktor Ogneviuk

Programme of Study (Vocational)

111.00.01 Mathematics

Level One (Bachelor)

Field of Knowledge:	11 Mathematics and Statistics
Specialty:	111 Mathematics
Qualifications:	Bachelor of Mathematics

Enacted since 01 September 2020
(Order No.434, 27 August 2020)

Kyiv – 2020

LETTER OF APPROVAL
Changes to Programme of Study (Vocational)

The programme was revised and renewed in 2020.

The Department of Computer Science and Mathematics

Protocol No. 9, 15 June 2020

The Head of the Department _____ Oksana Lytvyn

The Academic Council of the Faculty of Information Technology and Management
Protocol No. 6, 17 June 2020

The Head of the Academic Council _____ Alla Mykhatska

The Head of the SMC of Standardization and Quality Education
_____ Olha Leontieva

26.08.2020

Vice-Rector on Academic Affairs _____ Oleksii Zhyltsov

26.08.2020

PREAMBLE

The programme of study (vocational) complies with the Law of Ukraine "On Higher Education", and the Standard for Higher Education of Ukraine in the field of knowledge 11 Mathematics and Statistics, specialty 111 Mathematics, approved by the Order of the Ministry of Education and Science of Ukraine dated April 30, 2020.

The project group:

Maria Astafieva, PhD in Physics and Mathematics, Associate Professor, Associate Professor of the Department of Computer Science and Mathematics, Borys Grinchenko Kyiv University – project team leader (guarantor)

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Sergiy Radchenko, PhD in Physics and Mathematics, Associate Professor of the Department of Computer Science and Mathematics, Borys Grinchenko Kyiv University

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Svitlana Semenyaka, PhD in Physics and Mathematics, Associate Professor, Associate Professor of the Department of Computer Science and Mathematics, Borys Grinchenko Kyiv University

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External Reviewers:

Prof. Sergiy Lyashko, Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of physical and mathematical sciences, the Head of Computational Mathematics Department, Taras Shevchenko National University of Kyiv

Reviews of Representatives of Employers:

Viacheslav Boiko, Doctor of Physical and Mathematical Sciences, Senior Scientist, Leading Researcher of Department of Mathematical Physics, Institute of Mathematics of NAS of Ukraine.

Yurii Kinkov, Headmaster of Educational Complex No141 "Educational Resources and Technological Training", Kyiv, Teacher of Mathematics.

The educational program was put into effect on September 1, 2017.
Revision of the educational programme is once in 4 years.

Actualized:

Date of Review of the PS /Amendments to PS	27.08.2020		
Signature	Mariia Astafieva		
Full name of the Guarantor			

Grounding

Changes to the programme of study (vocational) are caused by the need to clarify the content of the programme of study (vocational) 111.00.01 "Mathematics" approved by the Academic Council of Borys Grinchenko Kyiv University from March 23, 2017 protocol No 3 (order from May 26, 2017 No 348). The order of the Ministry of Education and Science of Ukraine dated April 30, 2020 No 577 on the approval of the standard for higher education in the specialty 111 "Mathematics" for Level One (Bachelor) of higher education is taken into account.

In addition, during the implementation of the programme of study (fulfilment of the curriculum, development of programmes for academic disciplines, conducting practical training and attestation) throughout 2017-2018, 2018-2019, 2019-2020 academic years, the support group received feedbacks from teachers, students, heads of practice institutions and employers with some wishes on how to optimize some components of the programme of study.

Therefore, according to the Standard for Higher Education of Ukraine in the field of knowledge 11 Mathematics and Statistics, specialty 111 Mathematics for Level One (Bachelor) of higher education and reviews of stakeholders the changes to the following parts has been made:

- general information about the programme of study (specification of qualification),
- competencies of a graduating student,
- results of studying,
- components of programme of study and their succession.

These changes caused the development of a new version of the description of the programme of study.

I. PROFILE OF THE PROGRAMME OF STUDY (VOCATIONAL)

111.00.01 Mathematics
Specialty 111 Mathematics

1 - General information	
The full name of the higher education institution and the structural unit	Borys Grinchenko Kyiv University Faculty of Information Technology and Management
Degree of higher education and educational qualification	Degree of higher education – Bachelor Specialty – 111 Mathematics Programme of study – 111.00.01 Mathematics Qualification: Bachelor of Mathematics
Official name of the programme of study	111.00.01 – Mathematics
Type of diploma and term of study according to the programme	240 credits ECTS Bachelor degree, unitary term of study: 3 years 10 months
Availability of accreditation **Cycle / Level**	National Agency for Higher Education Quality Assurance. Certificate of accreditation programme Mathematics (No 3340, May 20, 2022). The certificate is valid to June 1, 2027. Level 6 of the National Qualification Framework of Ukraine
The education level required to commence study under the programme	FQ-EHEA – cycle one, EQF-LLL – level 6 Complete secondary education
Language (s) of teaching	Ukrainian
Validity of the programme of study	2027
Internet address of the permanent placement of the description of the programme of study	http://kubg.edu.ua/
2 - The purpose of the programme of study (vocational)	
To train experts who have fundamental and professional knowledge and developed practical skills in the field of modern fundamental and applied mathematics and mathematical modelling in various subject areas, and who are ready for further self-development and professional growth.	

3 - Characteristics of the programme of study	
Subject area	*Objects of study and activity:* mathematical structures, concepts and ideas for modelling and developing the theory in order to explain and / or optimize natural-technological or socio-economic phenomena; *Learning objective:* training of experts able to solve complicated tasks and practical problems of mathematics and mathematical modelling. *The theoretical content of the subject area:* mathematics and theoretical principles of mathematical methods of solving applied problems. *Methods, techniques and technologies:* methods of algebra, geometry, mathematical analysis, discrete mathematics, differential equations, probability theory and mathematical statistics, mathematical physics, computational mathematics, variational calculus and optimization, mathematical modelling, prediction of properties and behaviour of mathematical models on the basis of empirical data; analysis of mathematical objects and structures; methods of programming, methodology of abstract thinking, analysis and synthesis; information, and communication technologies. *Instruments and equipment:* Specialized software. *The proportion of the volumes of the general and professional components and optional parts:* Obligatory part – 180 ECTS credits (75%): - development of general competencies (28 ECTS credits, 840 hours) - professional and practical training (149 ECTS credits, 4470 hour, including course work in the second year of study, practice in the 2nd, 3rd, and 4th years of study, attestation exam); Field practice share: 22,5 ECTS credits (12,5 %). Optional part – 60 ECTS credits (25%): free choice academic disciplines.
Orientation of the programme of study	Programme of study (vocational) with applied focus. The program is based on well-known (classical) scientific results, taking into account the current state of mathematics, its active penetration into a wide variety of fields of knowledge and practical activity, focuses on topical specializations, within which further professional and scientific careers are possible.
The main focus of the programme of study	General education in the field of mathematics and its applications. Focus on the formation of skills necessary for the application of mathematical tools in applied fields (economics, finance, management, IT).
Specific features of the programme	
4 - Eligibility of graduates to employment and further studying	
Employment	Graduates of specialty 111 Mathematics can hold those positions which provide: - development, implementation and use of mathematical methods and algorithms in various fields, including economics, finance, IT;

	- mathematical support of theoretical and applied research in the field of natural sciences, technical sciences and economics. Functional responsibilities of graduates may range from participation in research to management.
Academic rights of graduates	Possibility of obtaining education at the second (Master) level. Acquisition of additional qualifications according to the system of postgraduate education

5 – Teaching and assessment

Teaching and learning	Student-centered learning, individual-personality approach. Teaching is implemented through studies based on research, strengthening of practical orientation and creative orientation is made in the form of a combination of lectures, practical classes, independent study and research work using elements of discipleship training, solving applied tasks, implementing projects, educational and production practice, course work.
Assessment	An accumulative rating system that includes assessment of students for all types of classroom and non-auditing educational activity (current, module, final control); modular control works, individual calculation and design work, tests, credits, practice reports, course work, examinations, complex examination.

6 - Programme competencies

Integral competence		Ability to solve complex mathematical problems and practical problems in professional activity or in the process of learning that pre-sees application of theories and methods of mathematics, statistics and computer technologies and is characterized by complexity and / or uncertainty of the conditions.
General competencies (GC)	**GC-1**	The ability to abstract thinking, analysis and synthesis
	GC-2	The ability to apply knowledge in practical situations
	GC-3	Knowledge and understanding of the subject area and professional activity
	GC-4	The ability to written and oral communication in official language
	GC-5	The ability to speak a foreign language
	GC-6	Skills to use information and communication technologies
	GC-7	The ability to learn and master modern knowledge
	GC-8	The ability to search, process and analyse information from various sources
	GC-9	The ability to make well-grounded decisions
	GC-10	The ability to work in a team
	GC-11	The ability to communicate with representatives of other professional groups of different levels (with experts in other fields)
	GC-12	The ability to work independently
	GC-13	Determination and persistence in terms of tasks and responsibilities
	GC-14	The ability to exercise one's rights and responsibilities as a member of the society, to understand the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine
	GC-15	The ability to preserve and multiply moral, cultural, scientific values and achievements of the society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of

		the society, techniques and technologies. The ability to use different types and forms of physical activity for active leisure and a healthy lifestyle
Professional competencies (PC)	**PC-1**	The ability to formulate problems mathematically and in symbolic form in order to simplify their analysis and solution.
	PC-2	The ability to provide mathematical reasoning and conclusions from them in a form suitable for the target audience, which is addressed, both verbally and in writing, as well as to understand the mathematical considerations of other persons involved in solving the same problem.
	PC-3	The ability to conduct and identify reasoning in mathematical proofs on the basis of the axiomatic approach, to arrange them in a logical order, and to distinguish main ideas from details and technical calculations.
	PC-4	The ability to conduct mathematical proofs on the basis of the axiomatic approach, the ability to distinguish plausible arguments from formally flawless.
	PC-5	The ability to quantitative thinking.
	PC-6	The ability to develop and study mathematical models of phenomena, processes and systems.
	PC-7	The ability to apply numerical methods for the study of mathematical models.
	PC-8	The ability to analyse mathematical structures, including the evaluation of the validity and effectiveness of the used mathematical approaches.
	PC-9	The ability to use specialized programming languages and software packages.
	PC-10	The ability to use computational tools for numerical and symbolic calculations.
	PC-11	The ability to apply mathematical facts, theorems, methods and algorithms, software packages to solving applied problems from various spheres of human life and society.
	PC-12	The ability on the basis of standard mathematical models to analyse large amounts of information, predict socio-economic processes, assess the state and prospects of business development, model the decision-making process and the results of their implementation.

7 – Programme learning outcomes

PLO 1	To know the main stages of historical development of mathematical knowledge and paradigms, to understand modern trends in mathematics.
PLO 2	To understand the legal, ethical and psychological aspects of professional activity.
PLO 3	To know the principles of modus ponens (rule for deriving logical expressions), and modus tollens (proof from supra), and to use conditions, formulation, conclusions, proofs and implications of mathematical statements.
PLO 4	To understand fundamental mathematics at the level required to achieve other requirements of the program of study.
PLO 5	To have the skills of using specialized software of computer and applied mathematics and to be able to use Internet resources.
PLO 6	To kow the methods of mathematical modelling of natural and / or social processes.
PLO 7	To explain mathematical concepts in a language understandable for non-specialists in the field of mathematics.
PLO 8	The ability to written and oral communication in Ukrainian and one of the foreign languages.

PLO 9	To be able to work with special literature in a foreign language
PLO 10	To solve problems with suitable mathematical methods, check the conditions for performing mathematical statements, correctly transfer the conditions and statements to new classes of objects, find and analyse the correspondences between the problem and known models.
PLO 11	To solve specific mathematical problems that are formally formulated; carry out basic transformations of mathematical models.
PLO 12	To search for the necessary scientific and technical information in the scientific literature, databases and other sources of information.
PLO 13	To know the theoretical basics and apply methods of mathematical analysis to the study of the functions of one and many actual variables.
PLO 14	To know the theoretical basics and apply methods of analytical and differential geometry to solving professional problems.
PLO 15	To know the theoretical basics and apply algebraic methods to the study of mathematical structures.
PLO 16	To know the theoretical basics and apply the methods of topology, functional analysis and theory of differential equations to the study of dynamical systems.
PLO 17	To know the theoretical basics and apply the basic methods of probability theory, random process theory and mathematical statistics to studying of random phenomena, testing hypotheses, processing of actual data and analysing durable random phenomena.
PLO 18	To know the theoretical basics and apply the methods of the theory of functions of a complex variable.
PLO 19	To know the theoretical basics and apply the methods of mathematical physics to modelling real physical, biological, environmental, socio-economic and other processes and phenomena
PLO 20	To solve basic mathematical tasks of data analysis; apply basic general mathematical models to specific situations; have skills in information management and application of computer tools for statistical data analysis.
PLO 21	To solve typical problems of mathematical analysis, algebra, differential and integral equations, optimization with the help of numerical methods.
PLO 22	To be able to formalize the tasks of a particular subject area, define their mathematical formulation and choose a rational method and algorithm of solving.
PLO 23	To use in practice specialized software products and software systems for data analysis, in particular, Big Data tools.
PLO 24	To be able to use modern technologies of programming and software development, software implementation of numerical and symbolic algorithms.

8 - Resource support for the implementation of the programme

Staff support	Staff support of the programme of study consists of the teaching staff of the department of Computer Science and Mathematics, the Faculty of Information Technology and Management, which ensures 90% of professional disciplines. Teaching of some disciplines is performed by teaching staff of the department of Foreign Languages (Faculty of Law and International Relations), department of Philosophy and Ukrainian History (Faculty of History and Philosophy), department of Ukrainian language (Institute of Philology), department of Physical Education and Sport Pedagogy (Faculty of Health, Physical Education and Sports), department of Theory and History of pedagogy (Pedagogical Institute), department of General, Age and Pedagogical Psychology (Institute of Human Sciences). The

	practical orientation of the programme involves a wide participation of specialists, which corresponds to the direction of the programme and strengthens the synergistic connection of theoretical and practical training. PS guarantor and teaching staff that ensures the programmes implementation meets the requirements set by the licensing conditions of educational activities of educational institutions.
Material and technical support	Plenty of specialized computer classes and laboratories equipped with computers with appropriate software, multimedia equipment, visual and methodological materials. All computers in classrooms have access to the Internet. Special classrooms, gyms.
Information, educational and methodological support	Educational and methodological support has been developed for all disciplines: programmes of study for academic disciplines; methodical materials for conducting seminars and practical classes; didactic support for independent work of students (with the use of ICT); programmes for all types of practice; methodical support of attestation. In order to expand access to quality study, e-learning courses have been created in the distance learning system Moodle. The main informational support is provided by library electronic resources, electronic scientific editions, electronic training courses, Microsoft cloud services.
9 – Academic mobility	
National Credit Mobility	
International Credit Mobility	Student mobility agreements were signed with Vilnius University (Lithuania)
Training of foreign applicants for higher education	The license provides the training of foreigners and persons without citizenship. The study is conducted in Ukrainian, so only citizens of other countries who speak Ukrainian at least at level B1 can receive education according to this programme of study.

II. The List of the Components of the Programme of Study (vocational) Mathematics and Their Logical Coherence

2.1 The List of the Components of the PS

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
Compulsory components of PS			
Formation of general competencies			
ОД3.01	University Studies	4	credit
	I am a student	1	
	Service leadership	1	
	Introduction to specialty	2	
ОД3.02	Foreign Language	10	exam
ОД3.03	Physical Education	4	credit
ОД3.04	Ukrainian Studies	6	exam
	History of Ukrainian Culture	2	
	Culture of oral and written speech (Ukrainian)	2	
	Rights of a human and citizen of Ukraine	2	
ОД3.05	Philosophical Studies	4	exam
Formation of professional competencies			
ОДФ.01	Elementary Mathematics (practicum)	8	exam
ОДФ.02	Linear Algebra	4	exam
ОДФ.03	Mathematical Analysis 1	11	exam
ОДФ.04	Computer Science and Programming	9	credit
ОДФ.05	Analytical Geometry	4	exam
ОДФ.06	Algebra and Number Theory	5	exam
ОДФ.07	Mathematical Analysis 2	11	exam
ОДФ.08	Probability Theory and Mathematical Statistics	5	exam
ОДФ.09	Discrete Mathematics	4	exam
ОДФ.10	Methods of Optimization and Operations Research	4	credit
ОДФ.11	Course paper in Mathematics	1	credit
ОДФ.12	Complex Analysis and Operating Calculus	7	exam
ОДФ.13	Differential Geometry and Topology	5	exam
ОДФ.14	Theoretical Mechanics	4	exam
ОДФ.15	Differential Equations and Dynamic Systems	12	
	Ordinary Differential Equations	4	exam
	Integral Equations	2	credit
	Modelling of Dynamic Systems	2	credit
	Equations of Mathematical Physics	4	exam
ОДФ.16	Numerical Methods	4	credit
ОДФ.17	Projective Geometry and Image Methods	4	credit
ОДФ.18	Analysis of Big Data	6	exam
ОДФ.19	Functional Analysis and Variation Calculus	4	exam
ОДФ.20	Econometrics	5	credit

ОДФ.21	Decision theory	4	credit
ОДФ.22	Applied Modelling and Programming	7	exam
Total for theoretical training		***156***	-
Practice			
ОП.01	Educational (in Mathematics)	6	credit
ОП.02	Productive (in Mathematics)	16,5	credit
Total for practice		***22,5***	-
Attestation			
ОА.1	Complex Examination	1,5	
Total amount of the compulsory components:		**180**	
Optional components of EP			
Optional block 1 – "Secondary Education (Mathematics)"			
ВДС.1.01	Psychology	4	credit
ВДС.1.02	Pedagogy	5	exam
ВДС.1.03	Inclusive Education	4	credit
ВДС.1.04	E-learning Technologies	4	exam
ВДС.1.05	Practicum on Solving Olympiad Problems in Mathematics	4	credit
ВДС.1.06	Methods of Teaching Mathematics	10	exam
ВДС.1.07	Foreign Language (advanced course)	8	credit
ВП.1.01	Educational Practice	3	credit
ВП.1.02	Productive Practice	16,5	credit
ВА.1.01	Complex Examination	1,5	
Total for specialization		60	
Optional block 2 – Choice from the course catalogue			
ВДС.2	(a student chooses disciplines for the appropriate number of credits)	60	credits
Total amount of the optional components		**60**	
TOTAL AMOUNT OF THE PROGRAMME OF STUDY		**240**	

2.2 Structural Logical Scheme of the Programme of Study (Vocational)

1st year		**2nd year**		**3rd year**		**4th year**	
I. Compulsory part							
University Studies *4 credits*		University Studies *6 credits*	Philosophical Studies *4 credits*	Differential Geometry and Topology *5 credits*	Projective Geometry and Image Methods *4 credits*	Functional Analysis and Variation Calculus *4 credits*	
Foreign Language *5 credits* *5 credits*		Algebra and Number Theory *5 credits*	Discrete Mathematics *4 credits*	Complex Analysis and Operating Calculus *7 credits*	Numerical Methods *4 credits*	Econometrics *5 credits*	
Physical Education *2 credits* *2 credits*		Probability Theory and Mathematical Statistics *5 credits*	Methods of Optimization and Operations Research *4 credits*	Theoretical Mechanics *4 credits*	Analysis of Big Data *6 credits*	Decision theory *4 credits*	
Elementary Mathematics *4 credits* *4 credits*		Mathematical Analysis 2 *5 credits* *6 credits*		Differential Equations and Dynamic Systems *12 credits*		Applied Modelling and Programming *7 credits*	
Linear Algebra *5 credits*	Analytical Geometry *5 credits*		Coursework in Mathematics *1 credit*	Ordinary Differential Equations *4 credits*	Modelling of Dynamic Systems *2 credits*	Productive practice in Mathematics *6 credits*	Productive practice in Mathematics *10,5 credits*
Mathematical Analysis 1 *6 credits* *5 credits*			Educational practice in Mathematics	Integral Equations *2 credits*	Equations of Mathematical Physics		**Attestation (*1,5 credits)*:** Complex

		3 credits		*4 credits*		Examination in Higher Mathematics
Computer Science and Programming *4 credits* *5 credits*				Educational practice in Mathematics *3 credits*		
II. Optional part						
	Block 1 “Secondary Education (Mathematics)”, 60 credits					
	Psychology *4 credits* Pedagogy *5 credits*	E-learning Technologies *4 credits*	Practicum on Solving Olympiad Problems in Mathematics *4 credits*			
	Inclusive Education *4 credits*	Educational Practice in Pedagogy *3 credits*	Methods of Teaching Mathematics *2 credits* *6 credits* *2 credits*			Productive practice in Pedagogy *16, 5 credits*
	Foreign Language (advanced course) *2 credits* *1 credit* *2 credits* *1 credit* *2 credits*					**Attestation (*1,5 credits)*:** Complex Professional Examination
	Choice from the course catalogue, 60 credits *15 credits* *8 credit* *8 credits* *7 credit* *4 credits* *18 credits*					

III. Form of Attestation of Higher Educational Learners

The graduate students majoring in 111 Mathematics (Programme of Study (Vocational) Mathematics) get attestation in the form of complex examination, which aims to verify the achievement of learning outcomes defined by the Standard and this program of study.

The attestation is performed openly and publicly.

For the successful completion of the programme of study, graduate students are given the document of the state standard issued to confirm that they are awarded with the degree and education qualification of: Bachelor of Mathematics.

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

	ОДЗ.01	ОДЗ.02	ОДЗ.03	ОДЗ.04	ОДЗ.05	ОДФ.01	ОДФ.02	ОДФ.03	ОДФ.04	ОДФ.05	ОДФ.06	ОДФ.07	ОДФ.08	ОДФ.09	ОДФ.10	ОДФ.11	ОДФ.12	ОДФ.13	ОДФ.14	ОДФ.15	ОДФ.16	ОДФ.17	ОДФ.18	ОДФ.19	ОДФ.20	ОДФ.21	ОДФ.22	ОП.01	ОП.02	ОА.1
GC-1					+	+	+	+		+	+	+			+		+	+				+	+	+	+	+	+			+
GC-2	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-3	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-4	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-5		+							+														+		+	+	+			
GC-6	+								+							+							+		+		+			+
GC-7	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
GC-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
GC-9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+	+	+
GC-10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+		+		+	+	+	+	
GC-11																			+	+	+	+				+	+	+	+	+
GC-12	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-13	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-14	+			+																						+		+	+	
GC-15	+		+	+	+				+																				+	
PC-1						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+		
PC-2						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+		
PC-3						+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+					
PC-4						+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+		+		+		
PC-5						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+
PC-6						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+		+	+	+	+
PC-7																					+						+	+	+	+
PC-8						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
PC-9									+											+	+		+				+	+	+	
PC-10						+			+							+					+		+				+	+	+	
PC-11						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PC-12													+		+	+				+			+		+	+	+		+	

V. Matrix of Providing Programme Learning Outcomes (LO) with the Relevant Programme Components

	ОДЗ.01	ОДЗ.02	ОДЗ.03	ОДЗ.04	ОДЗ.05	ОДФ.01	ОДФ.02	ОДФ.03	ОДФ.04	ОДФ.05	ОДФ.06	ОДФ.07	ОДФ.08	ОДФ.09	ОДФ.10	ОДФ.11	ОДФ.12	ОДФ.13	ОДФ.14	ОДФ.15	ОДФ.16	ОДФ.17	ОДФ.18	ОДФ.19	ОДФ.20	ОДФ.21	ОДФ.22	ОП.01	ОП.02	ОА.1
LO-1	+					+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+			+	+	+	+
LO-2	+			+	+																							+	+	
LO-3						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+
LO-4						+	+	+		+	+	+			+		+	+							+					+
LO-5	+								+											+	+						+	+	+	+
LO-6															+					+					+		+	+	+	+
LO-7						+	+	+		+	+	+	+	+	+		+	+		+	+	+		+	+		+	+	+	
LO-8		+		+		+	+	+	+	+	+	+	+	+	+		+	+		+	+	+		+			+	+	+	
LO-9		+														+							+		+		+	+	+	
LO-10						+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+		+	+			+	+	+
LO-11						+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
LO-12				+											+	+							+		+		+	+	+	
LO-13								+				+			+	+							+					+	+	+
LO-14										+						+		+									+	+	+	+
LO-15							+				+				+	+						+			+		+	+	+	+
LO-16															+			+		+				+	+	+		+	+	+
LO-17													+		+								+		+		+	+	+	
LO-18																	+									+			+	+
LO-19															+					+							+		+	+
LO-20									+												+		+				+		+	
LO-21							+	+			+	+			+					+	+					+				
LO--22															+					+					+	+	+			
LO-23									+														+				+			
LO-24									+					+							+		+				+			

Appendix 1 – Optional Part of Programme of Study

In Borys Grinchenko Kyiv University, students exercise the right to free choice of disciplines, granted in paragraph 15 of the first part of Article 62 of the Law of Ukraine "On Higher Education", in accordance with the Regulations on the procedure and conditions of choice of disciplines, approved by order No 642 from November 25, 2016.

Optional Block 1 – "Secondary Education (Mathematics)"

The student's choice of the block "Secondary education (Mathematics)" creates conditions for the formation of additional professional competencies (APC) within another specialty (014 Secondary education (Mathematics)), the aim of which is to deepen programme competencies within the main specialty 111 Mathematics, including foreign language, and to expand opportunities for further employment in educational institutions. In particular, students who have chosen this block would be able to work as teachers of mathematics in comprehensive schools and vocational schools of various forms of ownership; coaches of clubs and optional subjects; teachers of specialized courses in corporate academies, etc.

A student may choose the block "Secondary Education (Mathematics)" at the end of the first year of study, studying begins from the 2nd year and lasts till the 3rd year of study. Each semester, students have forms of control in various subjects of this block, as can be seen in the list of components and structural and logical scheme. Students should also do practical training. Complex Professional Examination, as an additional attestation, is provided within the study of the block.

Bachelors who have fulfilled the conditions for assigning a professional qualification (as defined in this section), in addition to the qualification "Bachelor of Mathematics" will receive the professional qualification "Teacher of Mathematics". The qualification is written in the supplement to the diploma.

Details of the formation of special (professional) competencies and programme learning outcomes are given below in the relevant matrices.

Additional special (professional) competences	
APC 1	The ability to use knowledge of psychology, pedagogy, mathematics, computer science, methods of teaching mathematics, Ukrainian studies and worldview disciplines to ensure the appropriate level of teaching in accordance with current programmes of study complying with the requirements of the State standard of basic and complete general secondary education
APC 2	The ability to model and organise the learning process; the ability to choose necessary means, forms and methods of organising student activities, including those students who have special needs, to design and create own educational products and resources; to introduce modern educational technologies, innovative approaches, advanced pedagogical experience.
APC 3	The ability to cultivate cognitive independence of each student, to adhere to a certain methodological approach in the study and analysis of a personality, to shape an educated person, prepared for active work in a high-tech society, an active and responsible citizen.
Additional programme learning outcomes	
PLO 1	To be able to plan the study of mathematics in accordance with current programmes of study complying with the requirements of the State standard of basic and complete secondary education and using various organizational forms and teaching tools;

	to be able to determine functions, goals and objectives of the study of mathematics, to prepare and conduct classes of various types, including distance learning.
PLO 2	To be able to use existing domestic and foreign teaching tools and create new ones, especially, computer-oriented; to develop tools for organising and monitoring students' knowledge and skills.
PLO 3	To be able to plan, organise and conduct extracurricular activities, out-of-school education in specific subjects, school subject competitions, educational work with students taking into account their age, physiological and psychological characteristics; to conduct successful communication with parents.

Matrices of the Programme Competence Compliance and Programme Learning Outcomes Compliance with the Optional Components of Block 1

	ВДС.1.01	ВДС.1.02	ВДС.1.03	ВДС.1.04	ВДС.1.05	ВДС.1.06	ВДС.1.07	ВП.1.01	ВП.1.02	ВА.01
GC1					+					
GC2	+	+	+	+	+	+		+	+	+
GC3	+	+	+	+	+	+		+	+	+
GC4	+	+	+		+	+		+	+	+
GC5							+			
GC6				+		+				+
GC7	+	+	+		+	+		+	+	
GC8	+	+	+		+	+		+	+	
GC9	+	+	+			+		+	+	+
GC10	+	+	+			+		+	+	
GC11	+	+	+	+		+		+	+	+
GC12	+	+	+	+	+	+		+	+	+
GC13	+	+	+			+		+	+	+
GC14										
GC15						+			+	
PC1					+	+			+	
PC2					+	+			+	
PC3					+				+	
PC4					+	+			+	
PC5					+					
PC6										
PC7					+					
PC8					+					
PC9				+						
PC10					+					
PC11				+		+			+	

	ВДС.1.01	ВДС.1.02	ВДС.1.03	ВДС.1.04	ВДС.1.05	ВДС.1.06	ВДС.1.07	ВП.1.01	ВП.1.02	ВА.01
LO-1	+				+					
LO-2	+	+	+					+	+	
LO-3					+	+			+	+
LO-4										
LO-5				+						
LO-6										
LO-7						+				
LO-8						+	+			
LO-9				+	+		+	+	+	+
LO-10					+					
LO-11					+	+			+	+
LO-12					+				+	
LO-13										
LO-14										
LO-15					+	+			+	+
LO-16										
LO-17										
LO-18										
LO-19										
LO-20										
LO-21										
LO-22					+				+	
LO-23						+			+	
LO-24										
PLO-1	+			+		+		+	+	+
PLO-2	+			+		+	+		+	+

	ВДС.1.01	ВДС.1.02	ВДС.1.03	ВДС.1.04	ВДС.1.05	ВДС.1.06	ВДС.1.07	ВП.1.01	ВП.1.02	ВА.01
PC12										
APC 1	+	+	+	+	+	+		+	+	+
APC 2	+	+	+	+		+		+	+	+
APC 3	+	+	+				+		+	

	ВДС.1.01	ВДС.1.02	ВДС.1.03	ВДС.1.04	ВДС.1.05	ВДС.1.06	ВДС.1.07	ВП.1.01	ВП.1.02	ВА.01
PLO-3	+	+	+		+	+			+	

Conditions for awarding professional qualification "Teacher of Mathematics"

Assigning the professional qualification "Teacher of Mathematics" requires successful (with a score of at least 75 points) mastering the competencies formed during the study of disciplines of optional block ВДС.1.01-1.07, undergoing productive (pedagogical) practice ВП.1.02, as well as taking complex examination ВА.1.01; achieving additional programme learning outcomes.

The University has no obligations to award professional qualifications to students who have not fulfilled the conditions for its awarding.

Optional block 2 – "Choice from the Course Catalogue"

The choice of disciplines from the catalogue of courses takes into account students' own needs and interests in future professional activity and allows them to deepen their knowledge and gain additional general and general professional competencies within related specialties and fields of knowledge and / or get acquainted with the current level of research in other fields.