

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution
higher education
NORTH CAUCASUS FEDERAL UNIVERSITY

APPROVED	I APPROVE
Educational and Methodological Council university	Chairman of the Academic Council of the Faculty of Mathematics and Computer Science named after Professor N.I. Chervyakov Grobova T.A.
Protocol <u>No. 5</u> dated “ <u>21</u> ” <u>05.20</u> 26	Protocol No. 12 from “27” 05.2026

EDUCATIONAL PROGRAM OF HIGHER EDUCATION

Direction of training	02.04.01 Mathematics and Computer Science
Directionality (profile)	Training Program for Electronic Information
Faculty	Mathematics and Computer Science named after Professor N.I. Chervyakov
Form of study	full-time
Year of commencement of studies	2026

OP VO developed:

Head of the educational program

Ph.D. Sciences, Associate Professor Grobova Tatyana Anatolyevna

AGREED:

Employer's representative

General Director of Medicine IT LLC

N.B. Podoprighora
(AND. ABOUT. Surname)

Protocol meetings

Educational and methodological commissions

Faculty of Mathematics and Computer Science

named after Professor N.I. Chervyakov

No. 10 from « 15 » May 20 20

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1. GENERAL PROVISIONS

The Master's degree program implemented by the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" (FSAI VO "NCFU") in the field of study 02.04.01 "Mathematics and Computer Science", focus (profile) "Artificial Intelligence in Cybersecurity" is a system of documents developed and approved by FSAI VO "NCFU" taking into account the requirements of the labor market based on the Federal State Educational Standard of Higher Education in the corresponding field of study (FSSES VO).

The educational program regulates the goals, expected results, content, conditions and technologies for implementing the educational process, assessing the quality of graduate training in a given area of training and includes: a curriculum, work programs of courses, subjects, disciplines (modules) and other materials that ensure the quality of training of students, programs of educational and industrial practices, a calendar academic schedule and methodological materials that ensure the implementation of the relevant educational technology.

This educational program defines:

- planned results of mastering the educational program (competencies of students established by the educational standard);
- planned learning outcomes for each discipline (module) and practice – knowledge, skills, abilities and (or) experience characterizing the stages of competence development and ensuring the achievement of the planned results of mastering the educational program.

Focus (profile) – “Artificial intelligence in cybersecurity”.

The form of study is full-time.

The language of implementation of the educational program is Russian.

Types of professional activities for which graduates of master's programs are prepared:

- scientific research;
- pedagogical;
- production and technological;
- organizational and managerial.

Planned results of mastering the educational program of higher education:

R 1 Readiness to communicate in oral and written forms in the state language of the Russian Federation and a foreign language to solve problems of professional activity;

R 2 Readiness to act in non-standard situations, bear social and ethical responsibility for decisions made, choose the most rational methods of protection and order in the actions of a small team in emergency situations;

R 3 Be able to lead a team in the area of their professional activity, tolerantly perceiving social, ethnic, religious and cultural differences.

R 4 Readiness to independently master new areas of activity, change the scientific, scientific-pedagogical and production profile of one's professional activity;

P 5 Readiness for independent development and mastery of new research methods and information technologies in the field of cybersecurity.

R 6 Be able to conduct a patent search, examine patentability and use

knowledge of the basic provisions of patent legislation and copyright of the Russian Federation, regulatory documents on the procedure for protecting intellectual property and know-how;

R 7 Be able to use modern information and communication technologies, global information resources in scientific research and calculation and analytical activities in the field of professional activity;

P 8 Be able to independently collect data, study, analyze and summarize scientific and technical information on the research topic, develop and use technical documentation in professional activities;

R 9 Be able to demonstrate knowledge in the field of cybersecurity;

P 10 Be able to create and explore new models of computing technology, the digital economy and the surrounding world.

For students with disabilities, this educational program is adapted based on the recommendations of the psychological, medical, and pedagogical commission and the individual's rehabilitation program. Education for students with disabilities is carried out in accordance with the "Regulations on the Organization of the Educational Process for Students with Disabilities and Individuals with Disabilities at the North Caucasus Federal University."

The development and implementation of the educational program of higher education in the field of training 02.04.01 Mathematics and computer science, focus (profile) "Artificial intelligence in cybersecurity" is provided by teaching staff who have a basic education corresponding to the profile of the discipline taught, extensive experience in scientific, practical and pedagogical activities and are systematically engaged in scientific and educational-methodological activities.

1.1. List of regulatory documents for the development of an educational program for higher education

The regulatory legal framework for the development of the educational program of the Master's degree program consists of:

- Federal Law of 29.12.2012 No. 273-FZ (as amended on 25.12.2018) "On Education in the Russian Federation";

- Federal Law of July 31, 2020 No. 304-FZ "On Amendments to the Federal Law "On Education in the Russian Federation" on Issues of Education of Students";

- Federal State Educational Standard of Higher Education – Master's Degree in the field of training 02.04.01 "Mathematics and Computer Science" dated August 23, 2017 No. 810;

- Order of the Ministry of Education and Science of Russia No. 885, the Ministry of Education of Russia No. 390 dated 05.08.2020 "On the practical training of students" (together with the "Regulations on the practical training of students");

- Order of the Ministry of Education and Science of Russia dated 06.04.2021 No. 245 "On approval of the Procedure for organizing and implementing educational activities under educational programs of higher education - bachelor's degree programs, specialist programs, master's degree programs";

- Resolution of the Government of the Russian Federation of 11.10.2023 No. 1678 "On approval of the Rules for the application by organizations carrying out

educational activities of e-learning and distance educational technologies in the implementation of educational programs";

- Order of the Ministry of Education and Science of the Russian Federation dated September 12, 2013 No. 1061 "On approval of the lists of specialties and areas of training in higher education";

- Order of the Ministry of Education and Science of Russia dated February 27, 2023 No. 208 "On Amendments to the Federal State Educational Standards of Higher Education";

- Order of the Ministry of Education and Science of Russia No. 882, the Ministry of Education of Russia No. 391 dated August 5, 2020 "On the organization and implementation of educational activities in the network form of implementation of educational programs";

- Professional standard "Programmer", approved by order of the Ministry of Labor and Social Protection of the Russian Federation dated July 20, 2022 No. 424-n;

- Professional standard "Systems Analyst", approved by order of the Ministry of Labor and Social Protection of the Russian Federation dated April 27, 2023 No. 367-n;

- Professional standard "Specialist in research and development", approved by order of the Ministry of Labor and Social Protection of the Russian Federation dated 04.03.2014 No. 121-n;

- Regulations on the development of educational programs for higher education at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University", approved by the Academic Council of NCFU, protocol No. 1 dated August 30, 2021;

- Regulation on the educational and methodological support of educational programs of higher education - bachelor's programs, specialist programs, master's programs at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University", approved by the Academic Council of NCFU, protocol No. 12 dated 02/20/2023;

- The Regulation on the head of the higher education educational program - bachelor's degree program, specialist's degree program, master's degree program at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" was approved by the Academic Council of NCFU, protocol No. 11 dated March 28, 2022;

- The Regulation on the organization of the educational process for network educational programs at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" (in a new edition) was approved by the Academic Council of NCFU, protocol No. 5 dated November 27, 2025;

- Charter of the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University", approved by order of the Ministry of Science and Higher Education of the Russian Federation dated December 28, 2018 No. 1365 (as amended on March 5, 2021, order No. 163);

1.2. General characteristics of the educational program of higher education

1.2.1. Mission of the higher education program

The mission of the OP VO is to ensure the modern quality of education and training of future master's students based on maintaining their fundamental nature and compliance with the current and future needs of the individual, society, and the state.

1.2.2. The purpose of the higher education program

The overall goal of the educational program of higher education is to develop students' personal qualities, as well as the formation of universal, general professional and professional competencies in accordance with the requirements of the Federal State Educational Standard of Higher Education in the direction of 02.04.01 Mathematics and Computer Science.

The main goal of the educational program is to prepare highly qualified master's degree students in mathematics and computer science, with a creative style of thinking, prepared for teaching, research, production and technological activities, taking into account the needs of the regional labor market and the traditions of the scientific school of the Department of Computational Mathematics and Cybernetics.

The main goal in the field of education is to form a socio-cultural environment, create the conditions necessary for the comprehensive development of the individual, and cultivate a cognitive interest in research and scientific project activities in the field of mathematics and computer science.

C1. Training of a socially adapted specialist capable of successful work in the field of computer technology;

C2. Providing in-depth theoretical and practical training that enables successful development, research, modification and use of new mathematical models;

C3. Development of skills and abilities in searching for optimal solutions when creating software.

C4. Development of skills in organizing and conducting projects, scientific and applied research, and development of new mathematical methods and models of computing systems.

1.2.3. Duration of higher education under the educational program

The period for obtaining an education under the Master's program in the field of training 02.04.01 "Mathematics and Computer Science" for full-time study, including holidays provided after passing the state final certification, regardless of the educational technologies used, is 2 years.

When studying according to an individual curriculum, the duration of study is 2 years.

1.2.4. Labor intensity of the higher education program

The standard workload of the educational program in the field of training 02.04.01 "Mathematics and Computer Science" is 120 credit units. The workload of the master's program for one academic year is 60 credit units.

Content	Labor intensity in weeks
	OFO
theoretical training and distributed practices	56
examination sessions	7
Practice, incl.	18

educational practice	2
industrial practice	6
pre-graduation practice	8
State final certification, incl.	4
preparation for and passing the state exam	2
preparation for the defense and defense of the final qualifying work	2
holidays	19
Total:	104

Content	Labor intensity in credit units
	OFO
theoretical training	81
examination sessions	
practice, incl.	33
<i>educational</i>	9
<i>production</i>	12
<i>pre-graduation practice</i>	12
state final certification, incl.	6
preparation for and passing the state exam	3
preparation for the defense and defense of the final qualifying work	3
Total:	120

1.3. Requirements for the level of training necessary for mastering the educational program of higher education

The applicant must:

1. Have a state-issued document on higher education.
2. Successfully pass the entrance examinations.

Admission is carried out on the basis of a competitive selection in accordance with the Rules for Admission to Study in Higher Education Programs - Bachelor's Degree Programs, Specialist's Degree Programs, Master's Degree Programs for the 2026/2027 Academic Year of the North Caucasus Federal University (NCFU).

1.4. Field of professional activity of graduates

Areas of professional activity and spheres of professional activity in which graduates of the Master's program in the field of training 02.04.01 Mathematics and Computer Science, who have mastered the program, can carry out professional activities:

- 06 Communications, information and communication technologies (in the areas of: software development and testing; creation and administration of information and communication systems and databases, management of information resources in the information and telecommunications network "Internet");
- 40 Cross-cutting types of professional activity in industry (in the field of development of automated production control systems).

Graduates may engage in professional activities in other areas of professional activity and/or spheres of professional activity, provided that the level of their education and acquired competencies meet the requirements for employee

qualifications.

Objects of professional activity of graduates

The objects of professional activity of graduates of the master's program in the field of training 02.04.01 Mathematics and computer science are the system-forming concepts of fundamental and applied mathematics, mathematical and algorithmic models, programs, software systems and complexes, methods of their design and implementation, educational programs and the educational process in the system of higher education, secondary vocational education and distance learning.

Types of professional activity

As part of the master's program, graduates are prepared to solve the following types of professional problems:

main:

- research;
- pedagogical;

additional:

- production and technological;
- organizational and managerial.

1.5 Tasks of professional activities of graduates

A graduate of the Master's program in the field of study 02.04.01 Mathematics and Computer Science, in accordance with the types of professional activities that the Master's program is oriented towards, is ready to solve the following professional problems:

research activities:

application of mathematical and algorithmic modeling methods in the analysis of real processes and objects in order to find effective solutions to general scientific and applied problems of a wide profile;

development of mathematical theory and mathematical methods;

creation of new mathematical models and algorithms;

conducting research in the field of mathematics and computer science;

development of fundamental principles and solution of applied problems in the field of secure information and telecommunication technologies and systems;

production and technological activities:

development of mathematical and software support for computers;

creation of methods and systems for information protection, intelligent systems;

development of methodological, technological and practical aspects of information retrieval and intelligent data processing;

development of methods of mathematical modeling, numerical methods necessary for the implementation of production and technological activities;

implementation of research results into practice;

organizational and managerial activities:

organization and holding of research seminars, conferences and scientific symposia;

management of production, technological and scientific research groups;

participation in the activities of state and other organizations aimed at developing an understanding of the essence and application of natural scientific methods in various areas of the life of the state and society.

teaching activities:

teaching physical and mathematical disciplines and computer science in general education organizations, professional educational organizations and organizations of additional education;

development of methodological support for the educational process in general education organizations, professional educational organizations and organizations of additional education;

socially oriented activities aimed at popularizing accurate knowledge, disseminating scientific knowledge among the general population, including young people, and supporting and developing new educational technologies.

1.6. Graduate competencies developed as a result of mastering the higher education program

The results of mastering the educational program of the Master's degree program are determined by the competencies acquired by the graduate, i.e. his ability to apply knowledge, skills and personal qualities in accordance with the tasks of professional activity.

As a result of mastering this educational program of higher education, the graduate must possess the following competencies:

Universal competencies (UC) of graduates and indicators of their achievement:

Category of universal competencies	Code and name of the universal competence	Code and name of the indicator for achieving universal competence
Systems and critical thinking	Capable of carrying out a critical analysis of problematic situations based on a systems approach and developing an action strategy (UK-1).	ID-1 UK-1 Selects information resources for searching for information in accordance with the assigned educational task. ID-2 UK-1 Systematizes information obtained from various sources in accordance with the requirements for completing the educational assignment. ID-3 UK-1 Formulates and argues conclusions and judgments, including using the philosophical conceptual apparatus.
Development and project implementation	Capable of managing a project at all stages of its life cycle (UK-2).	ID-1 UK-2 As part of the project activities, it models the technological processes of creation and processing of materials taking into account economic factors and in accordance with the

		requirements of environmental and industrial safety ID-2 UK-2 Implements a new project into production and manages it at all stages of its life cycle
Teamwork and leadership	Able to organize and manage the work of a team, developing a team strategy to achieve the set goal (UK-3).	ID-1 UK-3 Manages the production activities of employees ID-2 UK-3 Prepares and presents presentations of plans and results of personal and team activities
Communication	Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction (UK-4).	ID-1 UK-4 Forms and defends one's own opinions and scientific positions, including in a foreign language(s) ID-2 UK-4 Uses Russian and foreign languages as a means of business communication, clearly and distinctly presents problems and solutions, and justifies conclusions
Intercultural interaction	Able to analyze and take into account cultural diversity in the process of intercultural interaction (UK-5).	ID-1 UK-5 Analyzes and draws conclusions on social, ethical, scientific and technical issues arising in professional activities. ID-2 UK-5 Objectively evaluates the diversity of cultures and identifies their individual characteristics
Self-organization and self-development (including health preservation)	Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment (UK-6).	ID-1 UK-6 Ready for self-development, self-realization, and use of creative potential ID-2 UK-6 Defines and implements priorities of own activities

General professional competencies (GPC) of graduates and indicators of their achievement:

Category of general professional competencies	Code and name of general professional competence	Code and name of the indicator of achievement of general professional competencies
Theoretical and practical foundations of professional activity	Able to find, formulate and solve current and significant problems of applied and computer mathematics (OPK-1).	ID-1 OPK-1 Finds and formulates significant problems of applied and computer mathematics. ID-2 OPK-1 knows and uses methods for solving significant problems of

		applied and computer mathematics.
	Able to create and explore new mathematical models in the natural sciences, improve and develop concepts, theories and methods (OPK-2).	ID-1 OPK-2 Conducts research into new mathematical models in the natural sciences ID-1 OPK-2 Develops new and improves existing concepts, theories and methods
Information and communication technologies for professional activities	Capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones (OPK-3).	ID-1 OPK-3 Independently creates application software products ID-2 OPK-3 Knows and can find modern information technologies, including domestically produced ones, necessary for the creation of applied software products

Selection of professional standards corresponding to the professional activities of graduates

In accordance with paragraph 3.4 of the Federal State Educational Standard of Higher Education for the field of study 02.04.01 Mathematics and Computer Science, the professional competencies established by the master's program are formed on the basis of professional standards corresponding to the professional activities of graduates (if any), and also, if necessary, on the basis of an analysis of the requirements for professional competencies imposed on graduates in the labor market, generalization of domestic and foreign experience, consultations with leading employers, associations of employers in the industry in which graduates are in demand, and other sources.

Due to the lack of an approved PEP for the training program 02.04.01 Mathematics and Computer Science, SKFU, in accordance with paragraph 3.5 of the Federal State Educational Standard of Higher Education, independently determines professional competencies and indicators of their achievement, based on the focus (profile) of the bachelor's program, on the basis of professional standards corresponding to the professional activities of graduates from the register of professional standards posted on the specialized website of the Ministry of Labor and Social Protection of the Russian Federation "Professional Standards" (<http://profstandart.rosmintrud.ru>).

Field of professional activity	Professional standard	Generalized labor functions	Labor functions		Qualification level
			Name	Code	
06 Communications, information and communication technologies	001 Programmer	Requirements engineering and software design	Analysis of the feasibility of implementing requirements for computer software	D/01.6	6
			Development of technical specifications for software components and their interactions	D/02.6	6

	022. Systems Analyst	Conceptual , functional and logical design of medium and large scale systems and difficulties	Computer software design	D/03.6	6
			Planning the development or recovery of system requirements	C/01.6	6
			Analysis of the problem situation of stakeholders	C/02.6	6
			Developing business requirements for the system	C/03.6	6
			Setting goals for creating a system	C/04.6	6
			Development of the system concept	C/05.6	6
			Development of technical specifications for the system	C/06.6	6
			Organization of conformity assessment of existing systems and their analogues	C/07.6	6
			Presentation of the concept, technical specifications and changes to them to interested parties	C/08.6	6
			Organization of coordination of system requirements	C/09.6	6
			Development of requirements document templates	C/10.6	6
			Setting the task of developing requirements for the system subsystems and monitoring their quality	C/11.6	6
			Support of acceptance testing and commissioning of the system	C/12.6	6
			Processing requests for changes to system requirements	C/13.6	6
40 Cross-cutting types of professional activity in industry	011. Research and Development Specialist developments	Conducting research and development in the study of independent topics	Conducting patent research and determining the characteristics of products (services)	B/01.6	6
			Carrying out work on processing and analyzing scientific and technical information and research results	B/02.6	6
			Guiding a group of workers in researching independent topics	B/03.6	6

Professional competencies (PC) of graduates and indicators of their achievement

Tasks of professional activity	Code and name of professional competence	Code and name of the indicator of achievement of professional competence	Basis (PS, analysis experience)
Focus (profile) Parallel computer and network technologies			
scientific research type of professional activity tasks:			
development of	Able to demonstrate	ID-1 PC-1	PS, analysis of

mathematical theory and mathematical methods;	fundamental knowledge of mathematical and natural sciences, programming and information technology (PC-1).	In his professional activities, he demonstrates fundamental knowledge of mathematics and natural sciences. ID-2 _{PC-1} Solves problems of professional activity using programming and information technology tools	experience
application of mathematical and algorithmic modeling methods in the analysis of real processes and objects in order to find effective solutions to general scientific and applied problems of a wide profile;	Able to conduct scientific research based on existing methods in a specific area of professional activity (PC-2).	ID-1 _{PC-2} Conducts scientific research in the field of parallel computer technologies. ID-2 _{PC-2} Conducts reviews of scientific articles, abstracts and dissertations in the fields of mathematics and information technology	PS, analysis of experience
development of fundamental principles and solution of applied problems in the field of secure information and telecommunication technologies and systems	Capable of conducting methodological and expert work in the field of mathematics and computer science (PC-3).	ID-1 _{PC-3} Conducts expert work in mathematics. ID-2 _{PC-3} Conducts expert work in the field of computer science ID-2 _{PC-3} Prepares teaching materials in the fields of mathematics and computer science	PS, analysis of experience
conducting research in the field of mathematics and computer science	Capable of conducting patent research, determining forms and methods of legal protection and defense of rights to the results of intellectual activity, and managing rights to them to solve problems in the field of development of science, engineering and technology (PC-4).	ID-1 _{PC-4} Makes rational choices regarding methods of protecting intellectual property rights; ID-2 _{PC-4} Conducts patent research in the field of computing and communication systems.	PS, analysis of experience
creation of new mathematical models and algorithms	Able to present and adapt mathematical knowledge, programming methods and information technology in various ways, taking into account the level of the audience (PC-5).	ID-1 _{PC-5} Assesses the level of preparation of listeners during their public speeches ID-2 _{PC-5} Adapts the presentation of mathematical knowledge and programming methods to the level of the students	PS, analysis of experience

production and technological activities:			
creation of methods and systems for information protection, intelligent systems; development of methodological, technological and practical aspects of information retrieval and intelligent data processing; development of methods of mathematical modeling, numerical methods necessary for the implementation of production and technological activities;	Able to create and explore new mathematical models in the natural sciences, industry and business, taking into account the capabilities of modern information technology, programming and computer equipment (PC- 7).	ID-1 PC-7 With the help of modern information technologies, explores newly created mathematical models in the natural sciences of industry; ID-2 PC-7 Conducts Parallel Computer and Network Technologies as part of his professional activities ID-3 PC-7 Uses modern programming languages and application software packages to implement specific algorithms and mathematical models	PS, analysis of experience
development of mathematical and software support for computers; implementation of research results into practice;	Able to use modern methods of developing and implementing specific algorithms for mathematical models based on programming languages and application packages for modeling (PC-6).	ID-1 PC-6 Using modern software packages for modeling, it explores newly created mathematical models; ID-2 PC-6 Uses modern methods for developing algorithms for mathematical models ID-3 PC-6 Uses modern programming languages to implement specific algorithms and mathematical models	PS, analysis of experience
organizational and managerial activities:			
organizing and conducting research seminars, conferences and scientific symposia; management of production, technological and research groups;	Capable of participating in the management of projects for the creation of information systems and software packages at the stages of the life cycle (PC-8)	ID-1 PC-8 Manages the development, development and maintenance of information systems and software systems ID-2 PC-8 Knows and applies software development trends in his/her professional activities	PS, analysis of experience
participation in the activities of state and other organizations aimed at developing	Able to take into account knowledge of problems and trends in the development of the	ID-1 PC-9 Selects software for their professional activities, taking into account market	PS, analysis of experience

an understanding of the essence and application of natural scientific methods in various areas of the life of the state and society;	software market in professional activities (PC-9).	development trends. ID-2 PC-9 Takes into account the development trends of the software market and applies these development trends in professional activities	
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Achieving the results of mastering the educational program is carried out through the acquisition of a group of interconnected competencies (general professional, professional, additional), which constitute the consolidated learning outcomes (LO), which are formed within the framework of modules (the disciplines that comprise them) and allow the graduate to implement a certain type of professional activity and the specific work functions and professional tasks corresponding to it.

The ROs mastered within the modules (the disciplines that comprise them) ensure the gradual formation of the results of mastering the educational program.

List of planned learning outcomes and their constituent competencies

Learning outcome code	Learning outcome	Competencies developed within the framework of achieving learning outcomes
P1	Readiness to communicate orally and in writing in the state language of the Russian Federation and a foreign language to solve professional problems;	UK-4
P2	Readiness to act in non-standard situations, to bear social and ethical responsibility for decisions made, to choose the most rational methods of protection and order in the actions of a small team in emergency situations;	UK-1, PC-5
R3	Be able to manage a team in their professional field, tolerantly perceiving social, ethnic, religious and cultural differences.	UK-3, UK-5, OPK-3
P4	Willingness to independently master new areas of activity, change the scientific, scientific-pedagogical and production profile of one's professional activity;	UK-1, UK-2, UK-6, PC-6, PC-7
P5	Readiness for independent development and mastery of new research methods and information technologies in the field of mathematics.	PC-2, PC-8, PC-9
R6	Be able to conduct a patent search,	OPK-1, OPK-3, PC-4

	examine patentability and use knowledge of the basic provisions of patent legislation and copyright of the Russian Federation, regulatory documents on the procedure for protecting intellectual property and know-how;	
R7	To be able to use modern information and communication technologies, global information resources in scientific research and analytical activities in the field of professional activity;	OPK-3, PK-1, PK-3, PK-5, PK-8, PK-9
P8	Be able to independently collect data, study, analyze and summarize scientific and technical information on the research topic, develop and use technical documentation in professional activities;	OPK-2, PC-2, PC-8
P9	Be able to demonstrate knowledge in the field of mathematics and computer science	PC-1, PC-4, PC-5, PC-6, PC-7,
P10	Be able to create and explore new models of computing, the digital economy, and the surrounding world	OPK-2, OPK-3, PK-3, PK-4, PK-8

1.7. Documents regulating the content and organization of the educational process in the implementation of the higher education program

1.7.1. Academic calendar schedule

The academic calendar schedule indicates the sequence of implementation of the educational program of higher education by year, including theoretical training, examination sessions, practical training, state final certification, and holidays.

1.7.2. Curriculum

The curriculum lists the courses (modules), assessment exercises, final state assessments, and other types of educational activities, indicating their volume in credit units and hours, sequence, and distribution across study periods. For each course (module) and assessment, a form of midterm assessment is specified.

1.7.3. Work programs of disciplines (modules), including assessment funds

The working program of an academic discipline is a normative document defining the range of core competencies (knowledge, skills, and abilities) to be acquired in each individual subject, the content of disciplines (modules) in general and each lesson separately, the type and format of classes, the distribution of students' independent work, the form of ongoing and midterm assessment, the results of mastering disciplines (modules), etc. The development of working programs is carried out in accordance with the Regulation on the educational and methodological complex of the discipline of the Federal State Autonomous Educational Institution of

Higher Education "North Caucasian Federal University".

The educational program of higher education includes curricula for all academic disciplines (modules), both in the core and elective parts of the curriculum, including elective courses. Curricula for elective courses are developed but not included in the educational program.

Work programs are independent sections of the educational program of higher education.

The work program of each discipline (module) clearly formulates the final learning outcomes using a competency-based approach in strict accordance with the acquired knowledge, skills, and abilities in general for the educational program of higher education, taking into account the focus (profile) or specialization, specialty of the residency.

To assess students' personal achievements against the stage-by-stage requirements of the educational program, departments create assessment tool pools for ongoing academic performance monitoring and midterm assessment. These assessment tool pools are developed in accordance with the Regulation on the Formation of Assessment Tool Pools at the North Caucasus Federal University.

The assessment system for conducting ongoing monitoring of academic performance and midterm assessment of students, the forms, procedure and frequency of implementation are specified in the Regulation on the current monitoring of academic performance and midterm assessment of students in higher education programs - bachelor's programs, specialist programs, master's programs - at the North Caucasus Federal University (as amended on 07.12.2017, minutes of the Academic Council of NCFU No. 4), in the Regulation on the implementation and defense of coursework at the North Caucasus Federal University.

Students at the North Caucasus Federal University take no more than six exams and 10 credits during their midterm assessments during the academic year. This number does not include exams and credits for elective courses.

The department has established assessment tools for ongoing academic performance monitoring and midterm assessment. These are included in the curriculum and teaching aids and include:

- test questions and standard assignments for practical classes, laboratory and test papers, colloquiums, tests and exams;
- tests and computer testing programs;
- approximate topics for course projects/works, essays, etc.;
- other forms of control that allow us to assess the degree of development of students' competencies.

The fund of assessment tools for conducting interim assessment of students in a discipline (module) or internship, which is part of the work program of the discipline (module) or the internship program, respectively, must include:

- a list of competencies indicating the stages of their development in the process of mastering the educational program;
- description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales;

- standard test assignments or other materials necessary for assessing knowledge, skills, abilities and (or) work experience that characterize the stages of development of competencies in the process of mastering the educational program;
- methodological materials that define the procedures for assessing knowledge, skills, abilities and (or) work experience that characterize the stages of competence development.

To determine whether students' progress in higher education programs complies with the relevant requirements of the federal state educational standard, the graduating department creates a pool of assessment tools for conducting state final certification. The pool of assessment tools is developed in accordance with the Regulation on the Procedure for Conducting State Final Certification for Higher Education Programs – Bachelor's, Specialist's, and Master's Degree Programs at the North Caucasus Federal University (new version) (adopted by the NCFU Academic Council on December 7, 2017, Protocol No. 4).

The assessment tools for the state final certification, located in the teaching and methodological materials, include:

- a list of competencies that students must master as a result of completing the educational program;
- description of indicators and criteria for assessing competencies, as well as assessment scales;
- standard test assignments or other materials necessary for assessing the results of mastering the educational program;
- methodological materials defining the procedures for assessing the results of mastering the educational program.

1.7.4. Internship programs, including assessment funds

In accordance with the Federal State Educational Standard of Higher Education for the program 02.04.01 "Mathematics and Computer Science," the "Practical Training" section of the master's degree program is mandatory and represents a type of academic activity directly focused on the professional and practical training of students. These practical training sessions reinforce the knowledge and skills acquired by students through theoretical courses, develop practical skills and abilities, and contribute to the comprehensive development of students' universal, general professional, and professional competencies.

The "Practice" section includes educational and industrial practice.

The implementation of this educational program provides for the following types of practices:

a) Types of educational practice:

- Research work (acquiring basic skills in research work) – 2nd semester, distributed;
- Operational practice – 2nd semester, 2 weeks.

Method of conducting educational practice:

- stationary,
- visiting.

b) Types of industrial practice:

- Technological (project-technological) practice – 4th semester, 2 weeks;
- Research work – 3, 4 semester, distributed;
- Pre-graduation practice – 4th semester, 4 weeks.

Method of conducting industrial practice:

- stationary;
- visiting.

During the course of educational and industrial practice, students develop:

- primary professional skills and abilities;
- professional skills, abilities and experience of professional activity;
- scientific research skills.

Educational practice in the field of training 02.04.01 "Mathematics and Computer Science" is conducted at the Department of Computational Mathematics and Cybernetics.

Industrial practice is carried out in third-party organizations or in departments and other divisions of the university that have the necessary human resources and scientific and technical potential.

Internships at third-party organizations are based on agreements that provide students with internship placements and organizational, informational, and methodological support during their internship. Students may independently propose internship placements. In this case, a letter of request is sent from the faculty to the relevant organization. Students begin their internship only after official confirmation of approval from the organization (company). If vacancies exist, students may apply for them if the work they perform meets the requirements of the internship program.

Student internships are organized on the basis of practical training agreements concluded with the North Caucasus Federal University.

Upon completion of the internship, the student prepares a report on their internship, which they defend before a committee of faculty members. Based on the report's results, a grade is assigned (graded credit).

The assessment system for conducting student internships, the forms and procedure for conducting it are specified in the Regulation on the practical training of students of the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University", approved by the decision of the Academic Council of the Federal State Autonomous Educational Institution of Higher Education "NCFU", protocol No. 6 dated December 24, 2020

For each practice, programs have been developed that include:

- indication of the type of practice, method and form(s) of its implementation;
- a list of planned learning outcomes during internship, correlated with the planned outcomes of mastering the educational program;
- indication of the place of practice in the structure of the educational program;
- indication of the volume of practice in credit units and its duration in weeks or in academic or astronomical hours;
- content of practice;
- indication of forms of reporting on practice;

- fund of assessment tools for conducting interim assessment of students during practical training;
- a list of educational literature and Internet resources required for the internship;
- a list of information technologies used during the internship, including a list of software and information reference systems (if necessary);
- description of the material and technical base necessary for conducting the internship.

The fund of assessment tools for the internship provided by the educational program reflects questions and tasks that allow for an assessment of the degree of development of students' competencies and achievements during the internship process.

2. OTHER COMPONENTS DEVELOPED BY DECISION OF THE DEPARTMENT

Actual resource provision of the higher education program

The resource provision of the educational program of higher education is formed on the basis of the requirements for the conditions for the implementation of master's degree educational programs, determined by the Federal State Educational Standard of Higher Education in the field of training 02.04.01 " Mathematics and Computer Science ".

The University has a material and technical base that ensures the conduct of all types of lectures, seminars, practical and laboratory classes, as well as final qualifying work and research work of students, as provided for by the working curriculum for the direction 02.04.01 " Mathematics and Computer Science ".

A complete list of material and technical equipment for all types of classes is provided in the working programs of the discipline (modules) of the educational program of higher education.

The material and technical base complies with current sanitary and fire safety rules and regulations.

Staffing

The implementation of the Master's degree program is ensured by the management and scientific-pedagogical staff of the organization, as well as by persons involved in the implementation of the Master's degree program under the terms of a civil law contract.

No less than 70 percent of the Organization's teaching staff participating in the implementation of the Master's program and persons engaged by the University to implement the Master's program under other conditions (based on the number of positions to be filled, reduced to integer values) carry out scientific, educational, methodological and (or) practical work corresponding to the profile of the discipline (module) being taught.

At least 5 percent of the Organization's teaching staff participating in the implementation of the Master's program and persons engaged by the Organization to implement the Master's program under other conditions (based on the number of positions to be filled, reduced to integer values) are managers and (or) employees of

other organizations engaged in labor activities in the professional field corresponding to the professional activity for which graduates are being prepared (have at least 3 years of work experience in this professional field).

No less than 60 percent of the number of teaching staff of the Organization and persons involved in the educational activities of the Organization under other conditions (based on the number of positions to be filled, reduced to integer values) have an academic degree (including an academic degree obtained in a foreign state and recognized in the Russian Federation) and (or) an academic title (including an academic title obtained in a foreign state and recognized in the Russian Federation).

General management of the scientific content of the master's program is carried out by a research and teaching staff member of the university who has an academic degree (including an academic degree obtained in a foreign country and recognized in the Russian Federation), who carries out independent research (creative) projects (participates in the implementation of such projects) in the area of training, who has annual publications based on the results of the said research (creative) activities in leading domestic and (or) foreign peer-reviewed scientific journals and publications, and who also carries out annual testing of the results of the said research (creative) activities at national and international conferences.

Information and educational-methodical support

The educational program is provided with teaching and methodological documentation and materials for all courses, disciplines (modules) of the educational program.

Extracurricular work of students is organized in accordance with the "Regulations on the organization of independent work of students".

Each student, throughout the entire period of study, is provided with individual unlimited access to one or more electronic library systems and (or) electronic libraries containing publications of the main literature listed in the work programs of disciplines (modules), practices, formed on the basis of direct contractual relations with copyright holders.

The library collection is stocked with printed publications at a rate of at least 50 copies of each of the publications of the main literature listed in the work programs of disciplines (modules), practices, per 100 students.

The electronic library system (electronic library) and the electronic information and educational environment provide individual access for each student from any point where there is access to the Internet, both on the territory of the educational organization and outside it.

The electronic library system (electronic library) and electronic information and educational environment provide simultaneous access to at least 25% of students in a given field of study.

Students are provided with access to modern professional databases and information reference systems (their composition is defined in the course (module) syllabi and is updated annually). In addition to academic literature, the supplementary literature collection includes official, reference, bibliographic, and specialized periodicals.

The educational organization is provided with the necessary set of licensed

software (the composition is determined in the working programs of disciplines (modules) and is subject to annual updating).

Prompt exchange of information with domestic and international universities and organizations is carried out in compliance with Russian Federation intellectual property laws and international intellectual property treaties to which the Russian Federation is a party. Students are provided access to modern professional databases, information reference systems, and search engines.

Students with disabilities and individuals with limited abilities are provided with printed and electronic educational resources in forms adapted to their health limitations.

SKFU provides access to modern information resources:

- Electronic library system “University Library Online” – www.biblioclub.ru ;
- Electronic library system IPRbooks – <http://iprbooks.ru/> ;
- Electronic library system Lan – <https://e.lanbook.com/> ;
- Scientific electronic library e-Library – <https://elibrary.ru/> .

Logistics and technical support

North Caucasus Federal University (FSUE VO "SKFU"), which offers the Master's program in Mathematics and Computer Science (02.04.01), has the necessary facilities to support all types of lectures, laboratory classes, practical exercises, and other classes as stipulated by the educational standard and curriculum, and in compliance with current sanitary and fire safety regulations and standards, including for independent student research and development. The facilities include computers connected to a local area network and internet access.

The list of logistical support required for the implementation of this program includes:

- lecture halls with modern video projection equipment for presentations;
- classrooms for seminars and practical classes, equipped with multimedia equipment and educational furniture;
- specialized laboratories equipped with modern equipment;
- classrooms for foreign language classes, equipped with language lab equipment;
- a library with student workstations equipped with computers with access to databases, the university's local network and the Internet;
- computer classes with a total capacity of 100 seats.

The educational and laboratory facilities of the departments generally meet the requirements of the educational program.

A complete list of material and technical equipment for all types of classes is provided in the work programs of the disciplines (modules).

All classrooms are equipped with specialized furniture and technical teaching aids, which are used to present educational information to a large audience.

All laboratories are equipped with specialized educational and laboratory furniture, laboratory equipment, laboratory stands, specialized measuring equipment, and means for operational quality control of students' preparation for laboratory work and the quality of the work itself.

List of laboratories and main equipment of the Department of Computational

Mathematics and Cybernetics.

– educational laboratories:

- "Laboratory of Mathematical Modeling"
- "Educational and Scientific Center for Computational Mathematics and Parallel Programming on Supercomputers";
- Data center
- NI Elvis II+ Interdisciplinary Laboratory Platform;
- Digital Electronics FPGA Board "Fundamentals of Digital Technology and FPGA Programming"
- National Instruments LabVIEW 2013 Software Suite;
- DEPO Race C770S1U supercomputer with two NVidia Tesla graphics coprocessors.

The rooms for independent student work are equipped with computers with the ability to connect to the Internet and provide access to the organization's electronic information and educational environment.

Financial support

Financial support for the implementation of the Master's program must be provided in an amount not less than the basic standard costs for the provision of public services in the field of education for a given level of education and area of training, specialty, established by the Ministry of Education and Science of the Russian Federation.

Characteristics of the university environment that ensure the development of universal competencies of graduates

The Charter of the Federal State Autonomous Educational Institution of Higher Education "North Caucasian Federal University" and the Concept of Educational Work define education as a purposeful process of developing high civic, moral, psychological and physical qualities in students, as well as habits of behavior and actions in accordance with the social and pedagogical requirements of society.

The primary goal of the educational program at North Caucasus Federal University (SKFU) is to create conditions for the personal fulfillment of university graduates in harmony with themselves and society. Achieving this harmony is the university's strategic focus in its educational activities.

The results and effectiveness of educational programs at the University are determined by their ability to assimilate and reproduce cultural values and social experience, as well as by the readiness and preparedness of young people for conscious engagement and independent creative work. The most important outcome of educational programs is the willingness and ability of students, future professionals, to self-change, self-development, and self-improvement.

The interconnection and interaction of all structural elements of the University, the unity of social and professional development; the targeted unity of the scientific, academic, educational, financial, economic, and other spheres of the University's activity; the close connection of the main areas of the educational process is ensured by a comprehensive, systemic approach.

The choice of priority areas of educational work at North Caucasus Federal University is associated with two complementary levels.

The first level involves the development of social competence in students, which is understood as knowledge and skills in the field of interaction with people and social institutions, mastery of techniques of professional communication and behavior, and can be considered as a measure of personal maturity.

The second level is associated with the formation of professional competence, which is defined as an integral characteristic of the business and personal qualities of a specialist, reflecting the level of knowledge, skills and experience sufficient to carry out a specific type of activity, as well as a moral position.

Educational work at the university is carried out in the following traditional areas:

- intellectual education;
- spiritual and moral education;
- civic-patriotic education;
- aesthetic education;
- physical education;
- legal education;
- environmental education;
- educational activities for the professional development of students;
- development of student self-government;
- development of project activities;
- prevention of antisocial forms of behavior.

Intellectual development is associated with the development of a scientific worldview, deep theoretical knowledge, and a professional stance in students. A scientific worldview includes: expanding and deepening diverse knowledge that shapes a scientific worldview; equipping students with the fundamental principles of scientific methodology and elements of a logical culture of thinking; developing the ability to independently expand general and specialized knowledge; and equipping students with creative skills for finding optimal solutions in non-standard situations when solving theoretical and practical problems.

The entire teaching staff of North Caucasus Federal University (SKFU) implements the ideas of this program, in accordance with the educational goals of the academic disciplines. The university's graduate departments coordinate this program.

Spiritual and moral education involves the formation of moral standards in students, the transformation of moral knowledge into moral convictions, the cultivation of moral feelings (conscience, honor, duty, dignity, etc.) and moral qualities (honesty, integrity, courage, consistency, etc.), a high culture of behavior, a sense of collectivism, and responsibility for solving social problems.

Spiritual and moral education is implemented by all structures of the North Caucasus Federal University (SKFU); university-wide activities are coordinated by the Department of Educational Work.

The organization of **civic-patriotic education** has the following goals: the formation and development of civic culture in students, a sense of love for the Motherland, a readiness to defend their Fatherland and contribute to its progress, the

formation and development of a respectful attitude towards the historical path of its people, a sense of involvement in contemporary social processes in the country, in the North Caucasus, and at their native university; the formation of ideas about civil society; knowledge of the national and state structure of the country and the specifics of the social and national policy of the state in the current context; overcoming manifestations of nationalistic prejudices in the consciousness and behavior of students; familiarization with the achievements and characteristics of the national cultures of the peoples of the country, the development of a culture of interethnic communication.

Aesthetic education involves developing aesthetic needs, feelings, and tastes consistent with the ideal of a civilized society, and developing students' interest and capacity for aesthetic activity. The essence of students' aesthetic development includes equipping them with the fundamentals of aesthetic theory, a proper understanding of beauty, and the ability to see and appreciate the beauty of life, work, the aesthetics of their future profession, and the beauty in human relationships and behavioral culture.

Physical education is conducted with the aim of developing and nurturing students' culture of physical self-improvement to improve their health and develop the physical and willpower qualities necessary for successful professional careers. Its core content includes: fostering a conscious need for physical exercise, improving health, and participating in sports clubs, competitions, and sports events; and ensuring maximum effectiveness in the physical training of young people.

Legal education is aimed at developing students' legal culture, respect for the law, and developing strong skills in assessing their own actions and the actions of others. It also fosters a scientific legal consciousness and understanding of the rule of law, equipping young people with the fundamental legal knowledge of the legal regulation of key areas of society and the fundamental rights and responsibilities of citizens. It also fosters respect for legal norms, and develops a rejection of illegal actions and a willingness to actively resist them.

Environmental education is focused on developing students' environmental awareness, fostering a caring attitude toward the natural environment, and skills for the rational use of natural resources. Key elements of environmental education include: enhancing students' knowledge of the interconnectedness between society and nature, contemporary environmental issues, and their responsibilities in environmental protection and sustainable nature management; and engaging students in practical water conservation and environmental restoration activities.

Based on the Federal Law "On Environmental Protection", the University has developed and is implementing the "Eco" environmental education program.

Professional development activities for students. The central element of professional education is professional development—the development of the individual through professional training and mastery of a profession. Professional development activities for students include: developing professional orientation, competence, and professionally important qualities, focusing on the individual student's personal development trajectory; assistance and support in developing academic skills; fostering the ability for personal self-determination and developing a

new professional lifestyle; identifying with and preparing for a future profession; and developing skills for professional self-presentation.

Developing Student Self-Government The primary goal of student self-government is to develop and deepen the University's democratic traditions, instill in students civic responsibility and an active, creative approach to learning and community service, and develop leadership skills in future professionals. The University's student self-government model includes the following: the University Student Council; the Student Trade Union; student associations at the institutes; and the Dormitory Student Council.

The Student Council is the governing body of the student self-government system, established as a permanent representative and coordinating body for students at North Caucasus Federal University. The purpose of the Student Council is to address important issues affecting student life, develop their social engagement, and support and implement social initiatives.

The student union works to protect the social, economic, and educational rights and interests of students. It monitors compliance with laws and regulations regarding student rights and benefits. It also provides financial assistance to students in difficult circumstances.

The Student Council of the dormitory aims to organize educational work with students living in the dormitory; ensure the successful adaptation of first-year students to living conditions in the dormitory; meet the needs of students living in the dormitories for intellectual, cultural, physical and moral development.

Participation in student government provides ample opportunities for students to realize their personal potential and develop additional competencies.

Developing project-based activities. As part of the "Perspektiva" Student Action School, students begin learning the fundamentals of social design, which they then continue through the "Design School" program. Students present their developed social projects and implement them at the University. The best projects are submitted for participation in city and regional social project competitions and the "Mashuk" youth festival.

Particular attention is paid to the implementation of projects that require professional skills from young people and provide the opportunity to develop professional competencies.

Prevention of antisocial behavior

The main areas of preventive work at the university include:

- implementation of anti-nicotine, anti-alcohol and anti-drug propaganda and education among the university's student youth;
- creation and development of a volunteer movement for the prevention of drug addiction;
- improving the forms of organizing leisure activities for student youth;
- Improving the forms of information and methodological support for drug addiction prevention in the university.

The University is conducting the following special preventive measures with students:

- organizing presentations by specialists (narcologists, employees of the internal affairs agencies, state drug control agencies, scientists, etc.) to University

students on the issues of tobacco smoking, alcohol consumption, drug use, and HIV infection among young people;

- organizing a consultation with a psychologist and drug addiction specialist for students from the “risk group”;
- annual holding of the month-long campaign “Prevention of drug addiction and HIV infection among students”;
- analysis of individual work of deans' offices, curators of academic groups with students at risk and their parents;
- holding competitions for social advertising (wall newspapers, posters, slogans, ditties) with anti-nicotine, anti-drug and anti-alcohol orientations;
- placement of stands with anti-drug information at the University and student dormitories;
- implementation of various anti-nicotine and anti-alcohol campaigns by the University student council;
- holding thematic cultural, mass and sporting events aimed at countering self-destructive types of behavior among student youth.

Targeted work to prevent antisocial behavior among university students is carried out on the basis of the “Plan of measures for the prevention of drug addiction, smoking and antisocial behavior among students of the Federal State Autonomous Educational Institution of Higher Education “North Caucasus Federal University”, developed for each academic year.

Regular monitoring of students' social status allows for timely support for students who find themselves in difficult life situations.

The University administration actively supports student initiative projects.

3. Educational program and calendar plan of educational work.

1. PURPOSE AND OBJECTIVES OF EDUCATION ACCORDING TO THE EDUCATIONAL PROGRAM¹

The purpose of the program – *based on basic social values, ensuring the personal development of students, manifested in:*

- *development of a positive attitude towards social values, i.e. development of their socially significant relations;*
- *acquiring experience of behavior corresponding to these values, experience of applying the acquired knowledge and attitudes in practice, and acquiring experience of carrying out socially significant activities.*

Program objectives:²

- development of worldview and actualization of the system of basic values of the individual;
- introducing students to universal moral standards, national foundations and academic traditions;
- fostering respect for the law, norms of collective life, and developing civic and social responsibility;
- fostering a culture of interethnic communication among young people;
- prevention of manifestations of national and religious extremism and national intolerance in the student environment;
- raising the level of safe behavior culture;
- the formation of a culture of interaction between Cossack societies and associations of the region and student associations of NCFU and the involvement of Cossacks in creative activities aimed at strengthening unity, harmonizing interethnic (interethnic) relations, preventing extremism and preventing conflicts on national and religious grounds among the youth of NCFU;
- development of a system of social support for student youth;
- fostering a culture of financial literacy, developing a system for protecting social rights and providing social guarantees for students belonging to a preferential category;
- fostering a positive attitude towards work, fostering socially significant purposefulness and responsibility in business relations;
- ensuring personal development and its social and psychological support, the formation of personal qualities necessary for effective professional activity;
- identifying and supporting talented youth, developing organizational skills and creative potential, and engaging students in the processes of self-development

¹The goals and objectives of the educational program must be consistent with the goals and objectives of the educational program and be consistent with the specific activities of the institute (faculty). The main features of the organized educational process and a brief description of the specific activities of the higher education educational program in the field of educational program are provided.

²From the main objectives of educational work at SKFU, it is necessary to formulate the objectives of educational work according to the educational program.

and self-realization;

- formation of a culture and ethics of professional communication;
- nurturing the individual's internal need for a healthy lifestyle and a responsible attitude towards the natural and socio-cultural environment;
- development of personal qualities and attitudes (responsibility , discipline , self-management), social skills (emotional intelligence , orientation in the information space, speed of adaptation , communication ; ability to work in a team) and management abilities (skills in making decisions under conditions of uncertainty and change, time management , leadership , critical thinking).

The educational program is developed in accordance with:

- Constitution of the Russian Federation;
- Federal Law of 29.12.2012 No. 273-FZ "On Education in the Russian Federation";
- Charter of SKFU;
- Federal state educational standard of higher education in the field of training (specialty) 02.04.01 Mathematics and computer science;
- The educational program at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" (approved by the decision of the Academic Council of NCFU, protocol No. 14 of May 27, 2021)
- The Development Program of the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" for 2012-2021", approved by the Order of the Government of the Russian Federation dated July 18, 2015 No. 1403-r "On Amendments to the Development Program of the Federal State Autonomous Educational Institution of Higher Professional Education "North Caucasus Federal University" for 2012-2021, approved by the Order of the Government of the Russian Federation dated May 28, 2012 No. 854-r" in terms of fulfilling the task of forming a high-quality contingent of students and the priority project of NCFU "Formation of a Competitive Personality";
- other regulatory and legal acts of the university in the field of education and educational policy.

2. EDUCATION PROGRAM IN THE STRUCTURE OF THE EDUCATIONAL PROGRAM

The educational work program and the educational work calendar plan are part of the basic professional educational program (hereinafter referred to as the OPEP), developed and implemented in accordance with the current federal state educational standard (hereinafter referred to as the FSES).

Working programs of education as a part of the main educational programs (BEP) implemented by the educational institution (developed for the period of implementation of the educational program and defines a set of key characteristics of the educational work system of the educational institution (principles, methodological approaches, goals, objectives, directions, forms, means and methods of education, planned results, etc.)).

3. CONTENT OF THE EDUCATIONAL PROGRAM

3.1. List of planned results of mastering the educational program, correlated with the planned results of mastering the educational program

In accordance with the main goals, objectives, and principles of education, the areas of educational activity implemented at the university are combined and divided into five Modules (or Blocks), which are included at all levels of academic and extracurricular work: in lectures, seminars, industrial practice, in the work of curators with students, in the activities of student public organizations, etc.

The constituent components of the five Modules (or Blocks), the implementation of which ensures the formation and development of professional and supra-professional competencies in graduates, as stipulated by the Federal State Educational Standard of Higher Education (the Educational Standard of Higher Education of North Caucasus Federal University), are presented in Table 1.

Table 1

Components of the Modules

Module 1	Module 2	Module 3	Module 4	Module 5
Civic consciousness, morality, patriotism	Civil and legal culture	Personal growth	Professional and labor culture	Professionalism
Formation of civic consciousness and a sense of patriotism; Moral and ethical education and personal development; Spiritual and moral values; Cultural and aesthetic education; Family and everyday education; Physical and sports education and personal development; Formation of the need for a healthy lifestyle; Volunteering and Volunteering; development of student self-government.	Formation of a worldview and a system of fundamental values: universal, civic, professional, determining the attitude of young people to a rapidly changing world; civic-patriotic education and legal education; formation of information culture and information security; environmental education and development of environmental thinking; intercultural interaction.	Formation of career trajectories for students and construction of personal development trajectories; formation of needs and creation of conditions for personal professional success of students (self-management); development of tactical and strategic thinking (for student activists); training students and familiarizing them with the forecast for the development of the labor market (professions of	Meta-skills; labor education, professional development and education of future specialists; development of constructive thinking skills; the formation of a need for concentration of spiritual, emotional, physical, mental strength and energy, internal balance and self-confidence to solve assigned tasks (resource state); development of teamwork skills, team building; project activities of students and project management; development of social and personal competencies (teamwork, leadership, emotional intelligence, etc.);	Professional adaptation to employment, improving career guidance and professional motivation; ecological, critical and reflective thinking; maintaining a resource state.

		the future); Introduction to the professions of the future and NTI markets.	ecological thinking.	
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As a result of mastering the working program of education in the training area (specialty) 02.04.01 Mathematics and computer science, students develop the following competencies:³

Module	Competencies being developed
1.Civic consciousness, morality, patriotism	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction
2. Civil and legal culture	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-2 is capable of managing a project at all stages of its life cycle. UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction UK-6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment
3. Personal growth	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction UK-6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics OPK-2 is capable of creating and exploring new mathematical models in the natural sciences, improving and developing concepts, theories and methods OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones. PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity

³Competencies are specified in accordance with the standard of the training area

4. Professional and work culture	UK-2 is capable of managing a project at all stages of its life cycle. UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics OPK-2 is capable of creating and exploring new mathematical models in the natural sciences, improving and developing concepts, theories and methods OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones.
5. Professionalism	PC-1 Able to demonstrate fundamental knowledge of mathematical and natural sciences, programming and information technology PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity PC-3 Capable of conducting methodological and expert work in the field of mathematics and computer science PC-4 Able to conduct patent research, determine forms and methods of legal protection and defense of rights to the results of intellectual activity, manage rights to them to solve problems in the field of development of science, engineering and technology PC-5 Able to present and adapt mathematical knowledge, programming methods and information technology in various ways, taking into account the level of the audience. PC-6 Capable of teaching physics and mathematics and computer science in the field of general education, secondary vocational education, additional education, and higher education PC-7 Able to plan and implement pedagogical activities taking into account the specifics of the subject area in educational organizations PC-8 Able to create and explore new mathematical models in the natural sciences, industry and business, taking into account the capabilities of modern information technology, programming and computer equipment PC-9 Capable of using modern methods of developing and implementing specific algorithms for mathematical models based on programming languages and application software packages for modeling

N o.	Module	Course, semester	Academic discipline ⁴	Competence being developed ⁵	Planned results of mastering the educational program within the framework of the Education Program
	Civic consciousness, morality, patriotism	1 1 2 4 4 2 2 4 4 3.4	Methodology of scientific research Project management in the professional field Foreign language in the field of professional communication Information security incident management for information systems Information Security Management Research work (acquiring basic research skills) Operational practice Technological practice Pre-graduation practice Research work	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	The student is able to perceive scientific knowledge in the field of fundamental training. Possesses a culture of thinking, speech, and communication. Able to perceive modern knowledge about information processes in nature and society, about computer technologies. The student is able to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts, and is able to develop and implement spiritual and moral education based on basic national values. The student has an understanding of the historical diversity of cultures and civilizations, the types and forms of cultural and social life, and the place of the national civilization in the global historical and cultural process. Able to perceive and have ideas about political relations and processes, understands the role and

⁴Disciplines are indicated in accordance with the curriculum of the educational program

⁵Competencies are specified in accordance with the curriculum of the educational program

					importance of political systems in the life of society, and is able to analyze the current political situation. Has a value-based understanding of physical education, possesses a system of skills and abilities that ensure the maintenance and strengthening of health, and the development and improvement of psychophysical abilities. Capable of taking a responsible attitude not only towards one's own health, but also towards the health of others.
	Civil and legal culture	1 1 2 4 4 2	Methodology of scientific research Project management in the professional field Foreign language in the field of professional communication Information security incident management for information systems Information Security Management Research work (acquiring basic research skills) Operational practice Technological practice	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-2 is capable of managing a project at all stages of its life cycle. UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction UK-6 Able to determine and implement priorities of one's own activities and ways to improve them	Based on legal norms and available resources and constraints, the student is able to identify a range of tasks within the framework of a given goal and select optimal solutions. They are able to interact socially and fulfill their role in a team. Capable of forming safe life activities and developing a safe personality. Possesses a developed legal awareness, knows the rights and freedoms of the individual and citizen, the foundations of the Russian legal system and legislation. Possesses a natural-scientific and humanistic worldview, has an

		2	Pre-graduation practice	based on self-assessment	understanding of the scientific, philosophical, and artistic pictures of the universe and man's place in it.
		4	Research work		Able to collaborate, participate in team work, support team decisions, strengthen and enhance team spirit, plan and coordinate their own and the team's actions to achieve goals.
		4	Data analysis in cybersecurity		
		3.4			
		3			
	Personal growth	1	Methodology of scientific research	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy	Able to manage their time, develop and implement a trajectory of self-development in their professional and social life. Ready to fully manage their own resources in their social and professional activities.
		1	Project management in the professional field	UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal	Able to interact with participants in professional relationships within the framework of the implementation of professional activities.
		2	Foreign language in the field of professional communication	UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction	Capable of carrying out professional activities based on specialized scientific knowledge.
		2	Research work (acquiring basic research skills)	UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	Possesses a high level of self-organization, shows interest and activity, constantly strives for self-affirmation and self-realization.
			Operational practice	UK-6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment	Capable of revising one's own positions in the context of developing science and changing social practice.
		2	Technological practice		Capable of professional development and improvement, self-education throughout life.
		4	Pre-graduation practice		
		4	Research work		
		3.4	Data analysis in cybersecurity	OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics	
		3	Ethics and Safety of Artificial Intelligence	OPK-2 is capable of creating and exploring new mathematical models in the natural sciences, improving and	
		2	Application of artificial neural		

		3.4	networks and deep learning in steganalysis	developing concepts, theories and methods	
		3	Organization of protection of confidential information	OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones.	
		2	Artificial neural networks	PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity	
		1.2	Intelligent information processing systems and machine learning		
		2	Methods and means of cryptographic information protection		
		2	Privacy-preserving machine learning models		
		4	Trusted Artificial Intelligence		
		4			
	Professional and labor culture	1	Project management in the professional field	UK-2 is capable of managing a project at all stages of its life cycle.	Capable of searching, critically analyzing, and synthesizing information, and applying a systematic approach to solving assigned tasks.
		2	Research work (acquiring basic research skills)	UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal	Capable of monitoring and evaluating the formation of the results of his professional activities, identifying and correcting difficulties in work.
			Research work	UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	Able to use psychological and pedagogical technologies in professional activities, necessary
		3.4	Technological (design and technological) practice	OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics	
		4	Information security incident management for information systems	OPK-2 is capable of creating and	

			Information Security Management	exploring new mathematical models in the natural sciences, improving and developing concepts, theories and methods	for individualization of activities.
		4	Foreign language in the field of professional communication	OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones.	Possesses knowledge of the laws of economic life in modern society, the problems of the functioning of economic systems, the value foundations of economic and labor activity, and is able to analyze major economic events.
		2	Ethics and Safety of Artificial Intelligence		Capable of project work based on a systems approach.
		2	Application of artificial neural networks and deep learning in steganalysis		Able to recognize social responsibility for the impact and results of their work on nature and society, and the environmental safety of the environment.
		3.4	Organization of protection of confidential information		
		3	Artificial neural networks		
		2	Intelligent information processing systems and machine learning		
		1.2	Methods and means of cryptographic information protection		
		2	Privacy-preserving machine learning models		
			Trusted Artificial Intelligence		
		4			
		4			

Professional ism	1	Programming paradigms	PC-1 Able to demonstrate fundamental knowledge of mathematical and natural sciences, programming and information technology	Recognizes the personal and social significance of the acquired profession. Able to analyze and critically perceive information, use the information received for forecasting. Possesses the skills of non-judgmental judgment, tolerance of differences and uncertainty, flexibility and adaptability of behavior. Shows empathy towards others and is able to reflect on his own emotions and experiences. Possesses current knowledge of project activities, community building and functioning, new economic markets and the employment process, as well as the ability to apply this information in practical areas. Demonstrates an understanding of labor market development processes, a willingness to navigate various stages of employment, and the ability to adapt to working in a team with a new workforce. Able to independently shape an individual trajectory of professional and personal development, build a career, and acquire additional knowledge and competencies depending on the emergence of
	1	Technologies for investigating computer crimes and incidents	PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity	
	3	Data analysis in cybersecurity	PC-3 Capable of conducting methodological and expert work in the field of mathematics and computer science	
	4	Pre-graduation practice	PC-4 Able to conduct patent research, determine forms and methods of legal protection and defense of rights to the results of intellectual activity, manage rights to them to solve problems in the field of development of science, engineering and technology	
	1	Methodology of scientific research	PC-5 Able to present and adapt mathematical knowledge, programming methods and information technology in various ways, taking into account the level of the audience	
	1	Information security	PC-6 Able to create and explore new mathematical models in the natural sciences, industry and business, taking into account the capabilities of modern information technology, programming and computer equipment	
	1	Research work	PC-7 Capable of using modern methods of developing and implementing specific algorithms for	
	3.4	Protection of intellectual property		
	2	Mathematical foundations of artificial intelligence		
	1	Operational practice		
	2	Application of artificial neural networks and deep learning in steganalysis		
	3.4	Intelligent methods for analyzing security protocols		
	3	Countering the spread and impact of malware and behavioral analysis		
	3	Computer viruses and how to combat them		

		3	Technological (design and technological) practice	mathematical models based on programming languages and application software packages for modeling	personal educational needs.
		4	Attacks on artificial intelligence systems	PC-8 Capable of participating in the management of projects for the creation of information systems and software systems at various stages of the life cycle	
		3	Project management in the professional field	PC-9 Able to take into account knowledge of problems and trends in the development of the software market in professional activities	
		1			

3.2. Assessment of students' mastery of the educational program according to the basic educational program

Entrance control – diagnostics of students' abilities and interests (testing, questionnaires, sociometry, survey).

Ongoing monitoring includes pedagogical observation during events, pedagogical analysis of creative work and student activities organized in the chosen format, the creation and analysis of student portfolios, and the placement of portfolios in the university's electronic educational environment.

N o.	Module	Competencies ⁶	Planned activities
1	Civic consciousness, morality, patriotism	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	1. Initiation into students 2. Participation in the "Soldier's Envelope" campaign 3. Organization of an exhibition of students' creative works "Modern Morality" 4. Participation in the All-Russian competition "My Country – My Russia" 5. All-Russian social advertising competition "Time to Decide" 6. Patriotic Song Festival-Competition "Soldier's Envelope" 7. Musical and poetry evenings at the Inspiration club 8. Youth Festival of Cultures of the Peoples of the North Caucasus Federal District "House of Friendship" 9. Organizing student participation in volunteer activities
2	Civil and legal culture	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-2 is capable of managing a project at all stages of its life cycle. UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including	1. "Holiday of Knowledge" 2. Festival "Hello! We're looking for talent!" 3. Maslenitsa (a student folk festival) 4. Student Spring Festival 5. Holiday wall newspaper competitions for calendar dates 6. Competition "Best Headman"

⁶Competencies are specified in accordance with the curriculum of the educational program

		in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction UK-6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment	7. School of Trade Union Activism of the North Caucasus Federal University 8. Round table with representatives of the Ministry of Internal Affairs of the Stavropol Territory
3	Personal growth	UK-1 Able to carry out a critical analysis of problematic situations based on a systems approach and develop an action strategy UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction UK-6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics OPK-2 is capable of creating and exploring new mathematical models in the natural sciences, improving and developing concepts, theories and methods OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones. PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity	1. Student Action School for First-Year Students "PROmotion" 2. Interregional student self-government and personal development camp "Vector" 3. All-Russian competition "Student Leader" 4. International Certification Olympiad "Trajectory of the Future" 5. Annual beauty, sports and artistic skills contest "Miss and Mister SKFU" 6. Shooting competition "YarMak" 7. Competition for the best first-year academic group "Zapusknoy" 8. Competition "Chronicles of Student Families" 9. Round table with the SKFU Medical Center 10. Annual Cyber-Sports Tournament
4	Professional and labor culture	UK-2 is capable of managing a project at all stages of its life cycle. UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	1. Youth Festival "Mashuk" 2. Student Personnel Program – K-Labs 3. Participation in the open festival of intellectual games "Crossroads" 4. Participation in the All-Russian student competition

		OPK-1 Capable of finding, formulating and solving current and significant problems in applied and computer mathematics OPK-2 is capable of creating and exploring new mathematical models in the natural sciences, improving and developing concepts, theories and methods OPK-3 is capable of independently creating application software based on modern information technologies and network resources, including domestically produced ones.	"Your Move". 5. Scholarship competition of the Vladimir Potanin Charitable Foundation
5	Professionalism	PC-1 Able to demonstrate fundamental knowledge of mathematical and natural sciences, programming and information technology PC-2 Able to conduct scientific research based on existing methods in a specific area of professional activity PC-3 Capable of conducting methodological and expert work in the field of mathematics and computer science PC-4 Able to conduct patent research, determine forms and methods of legal protection and defense of rights to the results of intellectual activity, manage rights to them to solve problems in the field of development of science, engineering and technology PC-5 Able to present and adapt mathematical knowledge, programming methods and information technology in various ways, taking into account the level of the audience PC-6 Able to create and explore new mathematical models in the natural sciences, industry and business, taking into account the capabilities of modern information technology, programming and computer equipment PC-7 Capable of using modern methods of developing and implementing specific algorithms for mathematical models based on programming languages and application software packages for modeling PC-8 Capable of participating in the management of projects for the creation of information systems and software	1. Graduation ceremonies for specialties and fields of study 2. Initiation into Students 3. Youth Festival "Mashuk" 4. Artificial Intelligence Hackathon 5. Participation in the All-Russian Mobility Program 6. Participation in the UMNİK program of the Russian Federation and Stavropol Krai 7. All-Russian competition of student works of the project "Professional Internships 2.0" 8. Digital Breakthrough Competition 9. Case-Solving Championship Case-Room "Grani" 10. Interuniversity Championship "Young Professionals" (WorldSkills Russia) 11. National Championship in Professional Skills among Persons with Disabilities and Individuals with Limited Health Abilities "Abilympics" 12. IT Career Days

		systems at various stages of the life cycle PC-9 Able to take into account knowledge of problems and trends in the development of the software market in professional activities	
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4. SCHEDULE OF EDUCATIONAL WORK IN DEVELOPING THE EDUCATIONAL PROGRAM

The schedule is presented in Appendix 1.

5. LIST OF RESOURCES NECESSARY FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS

5.1. Resource provision for the implementation of the Education Program

The resource provision that allows for the full implementation of the Educational Program at SKFU and the substantive part of educational activities includes the following types : regulatory and legal support; personnel support; financial support; information support; scientific, methodological and educational support; logistical support.

5.2. Regulatory framework

The regulatory framework for the educational program's work program is the Education Program at the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University" (approved by the decision of the Academic Council of NCFU, Protocol No. 14 dated May 27, 2021).

5.3. Staffing

A key component of the structure of the educational system is the human resources potential for educational activities at the university, which includes teachers, cultural and artistic workers, sports community workers, professional psychologists and teachers, leaders and managers, and organizers.

Coordination, organization and implementation of the educational program for the OP

at the institute (faculty) level – deputy director of the institute/dean (faculty) for educational/training and training work;

at the department level – heads of departments, deputy heads of departments for educational work/persons responsible for educational work in the department;

at the level of the academic group – curators of academic groups (1st-2nd years), deputy heads of departments for educational work/persons responsible for educational work at the department (in academic groups older than 2nd year).

Student self-government bodies (the NCFU Student Council, the NCFU Student and Postgraduate Trade Union Committee) participate at all levels in the implementation of the NCFU Education Program.

5.4. Financial support

The educational program is implemented through targeted cultural, physical education, sports, and health work with students and applies equally to all students, regardless of the sources of funding for educational programs.

Financial support for the implementation of the educational program for the educational program in the direction 02.04.01 Mathematics and Computer Science in terms of financing costs is formed taking into account the requirements of federal regulatory acts and local acts of the university.

5.5. Information support

The content of information support as a type of resource support for the implementation of the educational work program includes:

- informing students, teachers and staff of the graduating department about planned and past events and educational activities on the official website of the university – in the sections “Student Life News” , “Student Events of the Graduating Department”, etc., as well as on pages in social networks;
- other information - announcements of SKFU , announcements of SKFU .

5.6. Scientific, methodological and educational support

The content of the scientific, methodological and educational support for the educational program for the educational program 02.04.01 Mathematics and Computer Science is presented by educational, methodological and methodological manuals and recommendations for organizing educational work with students.

5.7. Logistics and technical support

The content of material and technical support as a type of resource support for the implementation of the educational work program includes:

1. Educational and auditorium facilities for conducting educational classes, equipped with multimedia and specialized equipment, technical teaching aids, visual aids, and simulation technology equipment;
2. Rooms for independent work of students, equipped with computer equipment with the ability to connect to the Internet and providing access to the electronic information and educational environment of SKFU;
3. Library collection of printed publications, electronic educational resources, professional databases, information and reference systems;
4. Barrier-free access, specialized portable equipment adapted to the health limitations and special needs of disabled students and individuals with limited health capabilities;
5. The material and technical base and resources of partner organizations, employers, and representatives of the professional community.

6. SKFU INFRASTRUCTURE, ENSURING THE IMPLEMENTATION OF THE WORKING EDUCATION PROGRAM

6.1.Sociocultural space. Network interaction with organizations, social institutions, and educational actors

To the infrastructure of SKFU, The following are included in the implementation of the Education Program:

- educational space (classrooms, computer labs, educational laboratories, specialized classrooms, computer and language labs, plaster casting workshop);
- scientific and educational centers (SEC);
- problematic research laboratories (PRL);
- research laboratories ;
- support services (transportation, communications, food service, etc.).

There are a number of sports facilities on the territory of SKFU, namely: a gymnastics sports hall, a games sports hall, a weight-training sports hall, a wrestling sports hall, a therapeutic physical training sports hall, a swimming pool, and the Burevestnik stadium.

The university buildings also house concert halls, an archeology museum, the Museum of Regional Literature and Literary Local History research and education center, a geological museum, a zoological museum, the SKFU Museum, and a museum center.

In addition, the university has named centers: the A.I. Ilchenko, the interactive platform "Territory of Mutual Understanding", the collective work space "Boiling Point of the North Caucasus Federal University", the specialized competence center "Young Professionals" in the competence "Electronics", the resource educational and methodological center for training people with disabilities and individuals with disabilities, the student innovation center "GranIT", the center for linguistic examinations and testing in the Russian language, the center for psychological support of personal and professional development, the mass media center, the educational laboratory "Technical means of customs control", the center of business games, the laboratory "Shooting Range", the youth center of Innovative Technologies of Territorial Design, the scientific and educational center of customs and logistics services, the educational laboratory "Service Technologies", forensic testing ground, forensic laboratory, training courtroom, scientific and educational laboratory "Ecoanalytical Laboratory", the international research laboratory "Electro and baromembrane technologies", the educational center "Virtual Worlds", the educational and scientific laboratory "Robotic Systems", ensuring the implementation of the Education Program.

The University provides ample opportunities for effective self-realization for student youth:

- through the activities of student and youth associations, creative groups and sports sections;
- by developing infrastructure for student design and modeling;
- through the harmonious integration of innovative forms of educational work into existing practices.

Strengthening the University's event-based educational activities contributes to the creation of a socio-cultural environment that fosters a corporate culture and

implements innovative approaches and forms of educational work with young people, aimed at maximizing the number of students involved in extracurricular activities and educational events. This is achieved through effective, methodologically sound, and coordinated collaboration between the University's administrative structures and student self-government bodies, and the development of a trajectory of partnerships based on mutual cooperation.

6.2. Sociocultural space

The following serve as socio-cultural spaces, as a space for the dissemination of a certain cultural area, developed by society and used in the education of SKFU students: the Stavropol Palace of Culture and Sports, the Palace of Children's Art, the Stavropol State Historical, Cultural and Natural Landscape Museum-Reserve named after G.N. Prozritelev and G.K. Prave, the Stavropol Regional Museum of Fine Arts, the Museum and Exhibition Complex "Russia - My History", and the Landscape Art Gallery of the Honored Artist of Russia P.M. Grechishkina, Art Gallery "Parshin", Museum of the History of the Cossacks, monuments, historical and architectural objects (temples), Stavropol Academic Order of the Badge of Honor Theater named after M. Yu. Lermontov, Cinema "SALYUT", Cinema Park Cosmos, Cinema "Etazhi", Stavropol Scientific Library named after M. Yu. Lermontov, Central Library of the Stavropol Centralized Library System, Stavropol Swimming Pool "Yunost", Sports and Health Building of SKFU, Ice Rink "Victoria", Ice Rink Stavropol-Arena, Stadium "Dynamo", Sports Complex "Spartak", etc., which have a certain level of involvement of students in active social relations.

6.3. Networking with organizations, social institutions and educational entities

The goal of NCFU's networking with its social partners is to foster the conscious and successful personal self-determination and self-realization of students and graduates in accordance with their individual inclinations, capabilities, and needs, as well as the objective situation in the labor market; to expand students' opportunities to develop individual educational paths; and to foster their cognitive interests to achieve successful personal results, including through participation in innovative projects.

List of social partners:

1) At the federal level: the autonomous non-profit organization "Russia – Land of Opportunities"; the Federal Agency for Youth Affairs; the All-Russian public organization "Russian Youth Union"; the Association of Student Sports Clubs of Russia; the All-Russian public youth movement "Association of Students and Student Associations of Russia"; the Russian Student Sports Union.

2) At the regional level: the Youth Policy Department of the Stavropol Krai Government; the Committee for Culture and Youth Policy of the Stavropol City Administration; and other public organizations and associations.

The scope of implementation of event-based activities (academic disciplines and educational activities) in the main educational programs in accordance with the level of training and course of study of students

Level	Well					
	1			2		
Master's degree	At least 16 events, including			At least 14 events, including		
	Module 1 – 15% Module 2 – 15% Module 3 – 30% Module 4 – 40%	Educational Discipline (quantity)	Events calendar plan (quantity)	Module 1 – 10% Module 2 – 10% Module 3 – 10% Module 4 – 30% Module 5 – 40%	Educational Discipline (quantity)	Events calendar plan (quantity)
		14	23		10	20

**SCHEDULE OF EDUCATIONAL EVENTS AND ACTIVITIES FOR THE ACADEMIC YEAR
ACCORDING TO THE EDUCATIONAL PROGRAM⁷ 02.04.01 MATHEMATICS AND COMPUTER SCIENCE**

M o d u l e s	Areas of educational activity	N o. p/ p	Name of the event	Duration of the event	Level of education	Semester	Person in charge of OOVO
M o d u l e 1	Formation of civic consciousness and a sense of patriotism; Moral and ethical education and personal development; Spiritual and moral values; Cultural and aesthetic education; Family and everyday education; Physical and sports education and personal development; Formation of the need for a healthy lifestyle; Volunteering and Volunteering; Development of student self-government	1.	Initiation into students	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		2.	Participation in the "Soldier's Envelope" campaign	2nd semester 2026-2027 academic year. year	Master's degree	2	Babenko M.G.
		3.	Ropes Course for First-Year Students	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		4.	Musical and poetic evenings at the Inspiration club	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		5.	Youth Festival of Cultures of the Peoples of the North Caucasus Federal District "House of Friendship"	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.

⁷The names of university-wide events are entered in accordance with the SKFU Education Program; events at the institute/faculty and department level are also provided for.

		6.	Organizing student participation in volunteer activities	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		7.	Patriotic Song Festival-Competition "Soldier's Envelope"	2nd semester 2026-2027 academic year. year	Master's degree	2	Babenko M.G.
M o d u l e 2	Formation of a worldview and a system of fundamental values: universal, civic, professional, determining the attitude of young people to a rapidly changing world; civic-patriotic education and legal education; formation of information culture and information security; environmental education and development of environmental thinking; intercultural interaction.	8.	"Holiday of Knowledge"	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		9.	Student Spring Festival	2nd semester 2026-2027 academic year. year	Master's degree	2	Babenko M.G.
		10.	Maslenitsa (a student folk festival)	2nd semester 2026-2027 academic year. year	Master's degree	2	Babenko M.G.
		11.	Student Spring Festival	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
		12.	Holiday wall newspaper competitions for calendar dates	2nd semester 2026-2027 academic year. year	Master's degree	2	Babenko M.G.
		13.	Competition "Best Headman"	2nd semester	Master's	2	Babenko M.G.

				2026-2027 academic year. year	degree		
		14.	Round table with representatives of the Ministry of Internal Affairs of the Stavropol Territory	1st semester 2026-2027 academic year year	Master' s degree	1	Babenko M.G.
		15.	School of Trade Union Activism of the North Caucasus Federal University	1st semester 2026-2027 academic year year	Master' s degree	1	Babenko M.G.
M o d u l e 3	Formation of career trajectories for students and construction of personal development trajectories; formation of needs and creation of conditions for personal and professional success of students (self-management); development of tactical and strategic thinking (for student activists); training students and familiarizing them with the forecast for the development of the labor market (professions of the future); Introduction to the professions of the future and NTI markets.	16.	Student Action School for First-Year Students "PROdvizhenie"	1st semester 2026-2027 academic year year	Master' s degree	1	Babenko M.G.
		17.	Interregional Camp for Student Self-Government and Personal Development "Vector"	2nd semester 2026-2027 academic year. year	Master' s degree	2	Babenko M.G.
		18.	All-Russian competition "Student Leader"	2nd semester 2026-2027 academic year. year	Master' s degree	2	Babenko M.G.
		19.	International Certification Olympiad "Trajectory of the Future"	2nd semester 2027-2028 academic year. year	Master' s degree	4	Babenko M.G.
		20.	Shooting competition "YarMak"	2nd semester 2027-2028 academic year. year	Master' s degree	4	Babenko M.G.

		21.	Competition for the best first-year academic group "Zapusknoy"	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		22.	Competition "Chronicles of Student Families"	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
		23.	Round table with the North Caucasus Federal University Medical Center	1st semester 2026-2027 academic year year	Master's degree	1	Babenko M.G.
		24.	Annual Cyber Sports Tournament	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
		25.	Annual beauty, sports, and artistic skills contest "Miss and Mister SKFU"	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
M o d u l e 4	Meta-skills; labor education, professional development and education of future specialists; development of constructive thinking skills; the formation of a need for concentration of spiritual, emotional, physical, mental strength and energy, internal balance and self-confidence to solve assigned tasks (resource state); development of teamwork skills, team	26.	Youth Festival "Mashuk"	1st semester 2027-2028 academic year	Master's degree	3	Babenko M.G.
		27.	K-Labs Student Career Program	1st semester 2027-2028 academic year	Master's degree	3	Babenko M.G.
		28.	Participation in the open festival of intellectual games "Crossroads"	2nd semester 2027-2028	Master's degree	4	Babenko M.G.

	building; project activities of students and project management; development of social and personal competencies (teamwork, leadership, emotional intelligence, etc.); ecological thinking.	29.	Participation in the All-Russian student competition "Your Move".	1st semester 2027-2028 academic year	Master's degree	3	Babenko M.G.
		30.	Participation in the UMNIK program of the Russian Federation and Stavropol Krai	1st semester 2026-2027 academic year	Master's degree	1	Babenko M.G.
		31.	Participation in the UMNIK program of the Russian Federation and Stavropol Krai	1st semester 2027-2028 academic year	Master's degree	3	Babenko M.G.
		32.	Vladimir Potanin Charitable Foundation Scholarship Competition	1st semester 2027-2028 academic year	Master's degree	3	Babenko M.G.
M o d u l e 5	Professional adaptation to employment, improving career guidance and professional motivation; ecological, critical and reflective thinking; maintaining a resource state.	33.	Graduation ceremonies for specialties and fields of study	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
		34.	Youth Festival "Mashuk"	2nd semester 2026-2027 academic year	Master's degree	2	Babenko M.G.
		35.	Artificial Intelligence Hackathon;	2nd semester 2027-2028 academic year. year	Master's degree	4	Babenko M.G.
		36.	Participation in the All-Russian Mobility Program	1st semester 2027-2028	Master's degree	3	Babenko M.G.

				academic year			
		37.	All-Russian competition of student works of the project "Professional Internships 2.0"	1st semester 2027-2028 academic year	Master' s degree	3	Babenko M.G.
		38.	Digital Breakthrough Competition	1st semester 2027-2028 academic year	Master' s degree	3	Babenko M.G.
		39.	Week of the Department of Mathematical Modeling	2nd semester 2027-2028 academic year. year	Master' s degree	4	Babenko M.G.
		40.	IT Career Days	2nd semester 2026-2027 academic year. year	Master' s degree	2	Babenko M.G.
		41.	Week of the Department of Mathematical Modeling	2nd semester 2026-2027 academic year. year	Master' s degree	2	Babenko M.G.
		42.	IT Career Days	2nd semester 2027-2028 academic year. year	Master' s degree	4	Babenko M.G.