

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

I APPROVE

Dean of the Faculty of Mathematics
and computer science named after
Professor N.I. Chervyakov ,
Candidate of Physical and
Mathematical Sciences, Associate
Professor T.A. Grobova

Internship Program

Operational Practice / Эксплуатационная практика

Direction of training	02.04.01 Mathematics and Computer Science
Directionality (profile)	Training Program for Electronic Information
Form of study	Full-time
Year of commencement of preparation	2026
Implemented in the 3rd semester	

Developed by

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Computational Mathematics and
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Stavropol, 2026

1. Objectives of the practice

The objectives of educational practice Operational Practice / Эксплуатационная практика in the field of study 02.04.01 Mathematics and Computer Science are:

- consolidation and deepening of theoretical knowledge;
- developing students' primary professional skills in the application of modern mathematical methods and software to solve problems in science, technology, economics and management, and the use of information technology in design, engineering, management and financial activities in organizations, institutions and enterprises of the city and region;
- the formation and development of professional competencies of the master's student, necessary for conducting independent research work, the result of which is the writing and successful defense of a final qualifying work.

2. Practice objectives

The objectives of operational practice are:

- professional orientation of students, formation of a complete understanding of their profession;
- fostering responsibility and independence in the performance of duties in primary positions in the field of application of modern mathematical methods and information technologies;
- development of practical skills in organizing work in the field of application of modern mathematical methods and information technologies.

3. The place of internship in the structure of the educational program

Place of practice in the structure of the educational program of higher education: Educational practice B2.V.01(U), 3 semester, 2 weeks.

Educational practice, in accordance with the federal state educational standard, is mandatory and represents a form of organization of the educational process directly focused on the professional and practical training of students.

The internship is based on the following disciplines and types of internship: Artificial Intelligence in Professional Activity, Mathematical Foundations of Artificial Intelligence and is the basis for pre-graduation internship.

4. Place and time of the internship

Type of practice – educational;

Type of practice – operational practice;

The form of the practice is discrete.

B2.V.01(U) operational internship is conducted in accordance with the curriculum. It is completed in the second semester and lasts two weeks. The internship is conducted at enterprises assigned by order of the North Caucasus Federal University and having signed an agreement on practical training. The selected enterprises have specific experience in mathematics and computer science and use new information technologies.

5. A list of planned practical outcomes, correlated with the planned outcomes of mastering the educational program

Code, formulation of competence	Code, indicator formulation	Planned results characterizing the stages of formation of competencies, indicators
UK-4 Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction	ID-1 UK-4 Forms and defends one's own opinions and scientific positions, including in foreign language(s) ID-2 UK-4 Uses Russian and foreign languages as a means of business communication, clearly and concisely presents problems and solutions, and substantiates conclusions	Personal positions and conclusions are clearly, logically, and reasonably expressed. Evidence is presented, references to authoritative sources are cited, and scientific theories and concepts are used correctly. Confidently defends their point of view, relying on logic, facts, and scientific arguments.
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	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	Freely expresses and defends his scientific positions in a foreign language, using specialized vocabulary. She effectively conducts academic debates, is able to consider alternative points of view, and presents argumentative counterarguments. Her presentations and written work are formatted according to academic standards.

6. Structure and content of the practice

The total labor intensity of educational practice operational practice is 3 credit units, 108 hours.

Sections (stages) of practice	Implemented competencies	Types of student work during practice	Labor intensity (hour.)	Forms current control
Preparatory	UK-4 PC-5	Industrial training, safety training	2	Interview
		Study of regulatory and technical documentation, educational and methodological materials	4	Interview
Functional-activity	UK-4 PC-5	Collection, processing and systematization of factual and literary material, fulfillment of production tasks	80	Written report Diary
Final	UK-4 PC-5	Preparation, execution and defense of the report	22	Written report Interview
		Total:	108	
		Total	108	

7. Using the material of the educational and methodological complex of practice

7.1 Use of the educational and methodological complex material

At the first stage, it is necessary to familiarize yourself with the structure of the internship, mandatory types of work and reporting forms.

To successfully complete the assignments for the practical training, the student must

complete all tasks planned by the instructor during the practical training.

7.2 Fund of assessment tools for practice

The Assessment Toolkit (AT) for educational practice operational internships is based on a list of acquired competencies, indicating the stages of their development during the internship. The AT provides objective monitoring of the achievement of planned learning outcomes. The AT includes:

- description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales;
- methodological materials defining the procedures for assessing knowledge, skills, abilities and (or) work experience, characterizing the stages of competence development;
- standard test assignments and other materials necessary for assessing knowledge, skills, and the level of mastery of the competencies being developed during the internship.

FOS is an appendix to this practice program.

8. Educational, methodological and informational support for practice

8.1. List of primary and secondary literature:

8.1.1 List of main literature:

1. Grekul, V.I. Methodological Foundations of IT Project Management Electronic resource: textbook / Yu.V. Kupriyanov / N.L. Korovkina / V.I. Grekul. - Methodological Foundations of IT Project Management, 2020-11-14. - Moscow, Saratov: Internet University of Information Technologies (INTUIT), University education, 2017. - 392 p. - The book is in the basic version of the IPRbooks electronic library system. - ISBN 978-5-4487-0144-3, unlimited copies

2. Dolzhenko, A. I. Technologies of team development of software for information systems. Electronic resource: Lecture course / A. I. Dolzhenko. - Technologies of team development of software for information systems, 2021-11-30. - Moscow: Internet University of Information Technologies (INTUIT), IPR Media, 2019. - 300 p. - The book is in the premium version of the IPR BOOKS electronic library system. - ISBN 978-5-4486-0525-3, unlimited copies

8.1.2 List of additional literature:

1. Baranyuk, V. V. Part 1: Systems and Software Engineering: Guidelines for Performing Practical Work. Part 1 / Baranyuk V. V., Part 1 // Systems and Software Engineering / Baranyuk V. V. - Moscow: RTU MIREA, 2020, unlimited copies 2. Batovrin, V. K.

2. Systems and Software Engineering. A Dictionary and Reference Electronic resource: Textbook for Universities / V. K. Batovrin. - Systems and Software Engineering. A Dictionary and Reference, 2019-04-19. - Saratov: Profobrazovanie, 2017. - 280 p. - The book is in the premium version of the IPR BOOKS electronic library system. - ISBN 978-5-4488-0129-7 3.

3. Bykadorova, E. A. Fundamentals of programming information content Electronic resource / Bykadorova E. A., Sinyavskaya O. N. - St. Petersburg: Lan, 2020. - 72 p. - ISBN 978-5-8114-4567-7, unlimited copies

4. Meyer, B. Object-Oriented Programming and Software Engineering / B. Meyer. - 2nd ed., corrected. - Moscow: National Open University "INTUIT", 2016. - 286 p. 4.

5. Ekhlakov, Yu. P. Software Project Management. Standards, Models. Electronic resource / Ekhlakov Yu. P.: textbook for universities. - 2nd ed., reprinted. - St. Petersburg : Lan, 2020. - 244 p. - ISBN 978-5-8114-5335-1, unlimited copies

6. Klaverov, V.B. Project Management. A Case Study in Practical Training. Electronic resource: a tutorial / V.B. Klaverov. - Saratov: IPR Media, 2018. - 142 pages. - The book is in the basic version of the IPRbooks electronic library system. - ISBN 978-5-4486-0076-0

7. Orlov, S. A. Software Engineering. Software Development Technologies: textbook / S. A. Orlov. - 5th ed., updated and supplemented. - St. Petersburg : Piter, 2017. - 640 p. - (Textbook for universities). - Appendices: pp. 620-628. - Bibliography : pp. 629-635. - ISBN 978-5-496-01917-0 7.

Software Engineering: a textbook / compiled by T. V. Kiseleva; Ministry of Education and Science of the Russian Federation; North Caucasus Federal University, 2. - Stavropol: SKFU, 2017. - 100 p.: schematic. - <http://biblioclub.ru/>

8.1.3 List of methodological literature :

1. Methodological recommendations for Operational Practice in 02.04.01 Mathematics and Computer Science.

8.1.4 Internet resources:

- <http://elibrary.rsl.ru/>
- <http://elibrary.ru/defaultx.asp>
- <http://www.consultant.ru/>
- <http://www.edu.ru/> – “Russian education” federal portal; <http://www.intuit.ru>
- [Website of the National Open University " Intuit "; http://www.citforum.ru – Website of the Information Technology Center.](http://www.citforum.ru)

8.2 Software:

No special software required

9. Logistical support for the internship

A classroom for lectures and seminars (practical work), group and individual consultations, ongoing assessments, and midterm assessments. The classroom is equipped with specialized furniture and technical teaching aids for presenting educational information to a large audience: personal computers, a teacher's computer, a projector, and a whiteboard. Internet access and access to the university's corporate network are available.

10. Features of mastering the practice by people with disabilities:

Students with disabilities are provided with special textbooks, teaching aids and didactic materials, special technical teaching aids for collective and individual use, the services of an assistant (helper) who provides students with the necessary technical assistance, as well as the services of a sign language interpreter and tactile sign language interpreters .

Internships for students with disabilities can be organized together with other students, as well as in separate groups.

The internship of a teacher with disabilities is carried out taking into account the characteristics of their psychophysical development, individual capabilities, and health status.

In order to ensure accessibility of higher education under the educational program for individuals with disabilities during their internship, the following is provided:

- 1) for visually impaired persons:
 - the presence of an assistant who provides the student with the necessary technical assistance, taking into account individual needs (helping to find a workstation, move around, read and complete assignments, including taking down dictation),
 - written assignments, as well as instructions on how to complete them, are written in larger font,
 - special textbooks, teaching aids and didactic materials (with large print and audio files),
 - individual uniform illumination of at least 300 lux,
 - If necessary, the student is provided with a magnifying device to complete the assignment;

- 2) for persons with hearing disabilities
 - the presence of an assistant who provides the student with the necessary technical assistance, taking into account individual needs (helping to find a workstation, move around, read and complete assignments, including taking down dictation),
 - the availability of sound amplification equipment for collective use is ensured; if necessary, the student is provided with sound amplification equipment for individual use;
 - provided with appropriate sound means for reproducing information;
- 3) for persons with disabilities who have musculoskeletal disorders (including severe impairments of the motor functions of the upper limbs or missing upper limbs):
 - written assignments are completed on a computer with specialized software or dictated to an assistant;
 - At the student's request, assignments can be completed orally.