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MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION

Federal State Autonomous

Educational institution of higher education

"NORTH CAUCASUS FEDERAL UNIVERSITY"

APPROVED BY

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PRODUCTION PROGRAM "OPERATIONAL PRACTICE"

Field of study	11.03.02 Infocommunication Technologies and Communication Systems
Profile	Intelligent Data Processing in Infocommunication Systems and Networks
Year of start of training	2026
Form of study	Full-time
Implemented in a semester	6

Developed by

Professor at the School of Digital Sciences,

Robotics and Electronics

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Dr. Tech. Sci., Professor

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Stavropol, 2026

1. Internship Goals

The purpose of operational practice is to consolidate theoretical knowledge and practical skills in the field of future professional activity, as well as to study information and communication technologies implemented at a particular enterprise, to develop skills for working with modern information and communication equipment and technical documentation within the framework of these technologies.

2. Objectives of the practice

The objectives of the practice are:

- study of the structure of the enterprise, internal regulations;
- study of technologies of the main types of work at this enterprise;
- study of the principles of labor organization on the example of a specific enterprise;
- study of modern information and communication technologies implemented at the enterprise;
- development of skills in working with basic information and communication equipment;
- study and inculcation of skills in the implementation of organizational and technical measures to ensure life safety at the enterprise as a whole and at the workplace;
- mastering the techniques and rules of technical operation of certain types of information and communication and auxiliary equipment;
- study of technologies, methods and development of skills for measuring the parameters of equipment, finding and eliminating damage;
- development of skills for working with regulatory and technical documentation for the operation and installation of equipment.

3. The Place of Practice in the Structure of the Educational Program of Higher Education

The place of practice in the structure of the EP HE: B2.V.02 (P) "Operational Practice" refers to the B2 "Practice" cycle.

The practice is based on the following disciplines: Introductory practice, Technological (design and technological) practice.

4. Place and time of the internship

The bases of operational practice are departments, laboratories of the university and other organizations of the city, which have: modern equipment, hardware and software for conducting research in the field of infocommunications, appropriate technologies and the necessary human resources scientific and technical potential.

Internship in third-party organizations is based on contracts, according to which students are provided with internship places, organizational, informational and methodological assistance in the process of internship. Such organizations are: PJSC Rostelecom Stavropol, PJSC Signal Stavropol, Telecom-S LLC Stavropol, JSC Concern Energomera Stavropol, JSC Monocrystal Stavropol, LLC Orintex Stavropol, GKU SK Regional Center of Information Technologies Stavropol, Infocom-S LLC Stavropol, Stilsoft LLC Stavropol. Students can independently search for places of internship. In this case, students submit to the department a petition (consent) of the organization to provide a place for internship with an indication of the period of its implementation. If there are vacant positions, students can be enrolled in them if the work performed meets the requirements of the internship program.

The choice of places for practical training for disabled persons and persons with disabilities is carried out taking into account the requirements of their accessibility for this category of students. When determining places of practical training for disabled persons and persons with disabilities, the recommendations of medical and social expertise reflected in the individual rehabilitation program of a disabled person regarding the recommended conditions and types of work must be taken into account.

Operational practice is carried out in the 6th semester for 2 weeks.

5. List of planned results of the internship, correlated with the planned results of the development of the educational program

Code, formulation of competence	Indicator code, wording	Planned results characterizing the stages of the formation of competencies, indicators
UK-6, Able to manage their time, build and implement a trajectory of self-development based on the principles of lifelong learning	ID-1 ^{UK-6} sets personal and professional goals in accordance with the level of its resources and priorities of actions, for successful development in the chosen field of professional activity	The ability to set personal and professional goals in accordance with the level of their resources and priorities for action, for successful development in the chosen field of professional activity, has been formed
	ID-2 ^{UK-6} implements and adjusts the strategy of personal and professional development, taking into account the conditions, means, personal capabilities, stages of career growth, the time perspective of the development of activities and the requirements of the labor market	The ability to implement and adjust the strategy of personal and professional development has been formed, taking into account the conditions, means, personal capabilities, stages of career growth, the time perspective of the development of activities and the requirements of the labor market
	ID-3 ^{UK-6} critically assesses the effectiveness of the use of time and other resources in solving the tasks set in the chosen field of professional activity	The ability to critically assess the effectiveness of the use of time and other resources in solving tasks in the chosen field of professional activity has been formed
UK-8, is able to create and maintain safe living conditions in everyday life and in professional activities to preserve the natural environment, ensure the sustainable development of society, including in the threat and occurrence of emergencies and military conflicts.	ID-1 ^{UK-8} is familiar with the general characteristics of ensuring security and sustainable development in various spheres of life; classification of military emergencies, principles and methods of organizing the protection of the population from dangers arising in peacetime and during military operations.	The ability to be guided in practical activities by the principles and methods of organizing the protection of the population from dangers arising in peacetime and during the conduct of hostilities has been formed.
	ID-2 ^{UK-8} assesses the probability of potential danger in everyday life and professional activities and takes measures to prevent it.	The ability to correctly assess the probability of potential danger in everyday life and professional activities and take measures to prevent it has been formed.
	ID-3 ^{UK-8} applies the basic methods of protection in the threat and occurrence of emergencies and military conflicts in everyday life and professional activities.	The ability to apply in practice the basic methods of protection in the threat and occurrence of emergencies and military conflicts in everyday life and professional activities has been formed.
PC-5. Ability to carry out installation, configuration, adjustment, testing of equipment, development of operating modes, control of design	ID-1 ^{PK-5} understands the current industry standards that determine the requirements for the parameters of the operation of equipment, channels and paths; methods for checking the technical condition of equipment, paths and transmission channels.	The ability to understand the current industry standards that determine the requirements for the parameters of the operation of equipment, channels and paths; methods for checking the

parameters of operation and testing of communication equipment, ensuring compliance of technical parameters of information and communication systems and/or their components with established operational and technical standards		technical condition of equipment, paths and transmission channels has been formed.
	ID-2PK-5 complies with the technologies for setting up, adjusting and testing communication (telecommunications) equipment, operating rules and methods of using measuring and testing equipment.	The performance of work on the configuration, adjustment and testing of communication equipment (telecommunications), the rules of operation and methods of using measuring and testing equipment have been formed.
	ID-3PK-5 performs settings, adjustments and tests of communication equipment (telecommunications) using technical and technological documentation; maintains technical and technological documentation in accordance with the established forms; checks the quality of equipment and communication facilities.	The ability to adjust, adjust and test communication equipment (telecommunications) using technical and technological documentation; maintain technical and technological documentation in accordance with the established forms; check the quality of equipment and communication facilities.
	ID-4PK-5 carries out incoming inspection of equipment, preparation of testing equipment, measuring equipment, devices; testing of equipment and development of equipment operating modes.	The ability to carry out incoming inspection of equipment, preparation of test equipment, measuring equipment, devices; testing of equipment and development of equipment operating modes has been formed.
	ID-5PC-5 selects and uses the appropriate test and measurement equipment, uses the equipment software when setting it up.	The ability to select and use the appropriate test and measuring equipment, to use the software of the equipment when setting it up has been formed.
PC-6, Capable of administering network subsystems of infocommunication systems and/or their components.	ID-1PK-6 understands the architecture and general principles of operation, hardware, software and software and hardware of the administered network, the procedure for configuring network elements of the infocommunication system.	The ability to use in practical activities the general principles of the functioning of hardware, software and software and hardware of the administered network, the procedure for setting up network elements of the information and communication system has been formed.
	ID-2PC-6 uses modern standards in the administration of devices and software; uses standard and external software and hardware to monitor the performance of the network infrastructure of the administered network.	The ability to be guided in practice by the requirements of modern standards in the administration of devices and software; to use standard and external software and hardware to control the performance of the network infrastructure of the administered network.
	ID-3PC-6 diagnoses failures and errors of network devices and software.	The ability to diagnose failures and errors of network devices and software has been formed.
	ID-4PK-6 carries out routine maintenance on	The ability to carry out routine

	network devices and software of the information and communication system.	maintenance on network devices and software of the information and communication system has been formed.
	ID-5PK-6 installs and configures the system and application software necessary for the functioning of the IS in accordance with the work assignment, carries out standard design and parameterization of the IS in accordance with the regulations of the organization.	The ability to install and configure system and application software necessary for the functioning of the IS in accordance with the work assignment, to carry out standard design and parameterization of the IS in accordance with the regulations of the organization has been formed.
PC-7, Capable of administering remote access security tools (operating systems and specialized protocols)	ID-1PC-7 understands and uses the basic principles, protocols and software cryptographic tools for ensuring the information security of network devices.	The ability to use the basic principles, protocols and software cryptographic tools for ensuring the information security of network devices has been formed.
	ID-2PC-7 understands the general principles of operation and architecture of hardware, software, software and hardware of the administered network; protocols of the channel, network, transport and application layers of the open systems interaction model.	The ability to understand the general principles of functioning and architecture of hardware, software, software and hardware of the administered network; protocols of the channel, network, transport and application layers of the model of interaction of open systems has been formed.
	ID-3PK-7 uses software, hardware and software and hardware to protect network devices from unauthorized access; configures the parameters of modern software and hardware firewalls.	The ability to use software, hardware and software and hardware means to protect network devices from unauthorized access has been formed; to configure the parameters of modern software and hardware firewalls.
	ID-4PC-7 connects and configures modern remote access security tools (operating systems and specialized protocols); works with control and measurement hardware and software.	The ability to connect and configure modern remote access security tools (operating systems and specialized protocols); to work with control and measurement hardware and software has been formed.
	ID-5PC-7 installs additional software products to ensure remote access security and parameterization.	The ability to install additional software products to ensure the security of remote access and their parameterization has been formed.
PC-8, Capable of routine maintenance on network devices and software of the information and communication system	ID-1PK-8 complies with the instructions for the installation and operation of the administered network devices and software; the regulations for preventive maintenance on the administered information and communication system.	The ability to install and operate the administered network devices and software has been formed, acting according to instructions; to use the regulations for preventive maintenance on the administered information and

		communication system.
	ID-2PC-8 installs operating systems of network devices; monitors administered network devices; uses standard data recovery procedures, works with archiving servers and operating system management tools; draws up a backup schedule for the operating systems of network devices; disassembles and assembles administered network devices.	Ability to install operating systems of network devices; monitor managed network devices; use standard data recovery procedures, work with archiving servers and operating system management tools; schedule backup of operating systems of network devices; disassemble and assemble managed network devices.
	ID-3PC-8 uses modern means of monitoring the performance of the administered network; it uses regulatory and technical documentation in the field of information and communication technologies to solve problems.	The ability to use modern means of monitoring the performance of the administered network has been formed; to use regulatory and technical documentation in the field of information and communication technologies to solve problems.
	ID-4PC-8 performs work on rebooting the operating systems of network devices, planning the schedule for copying the software of the network infocommunication system, restoring parameters using archiving servers and management tools of specialized operating systems of network equipment.	The ability to reboot the operating systems of network devices, plan the schedule for copying the software of the network infocommunication system, restore parameters using archiving servers and management tools of specialized operating systems of network equipment has been formed.
	ID-5PK-8 carries out routine maintenance of equipment in accordance with the manufacturer's recommendations.	The ability to carry out routine maintenance of equipment in accordance with the manufacturer's recommendations has been formed.

6. Structure and content of the internship

The total labor intensity of industrial operational practice is 3 credits, 81 hours.

Sections (stages) of practice	Implemented competencies / indicators	Types of educational work in practice, including independent work of students	Labor intensity (hours)	Forms of current control
Preparatory stage	UK-6, UK-8	- Orientation conference.	2.00	Interview
		- introductory briefing at the place of practice.	1.00	Interview
		- familiarization with the technical equipment of the enterprise.	1.00	Interview
		- drawing up an individual internship plan and its approval by the supervisor.	2.00	Interview
Main stage	PC-5, PC-6, PP-7,	- Problem statement;	96.00	Report, interview

	PP-8	- collection, processing and systematization of initial data, factual and literary material; - implementation of all stages of technological processes.		
Final stage	UK-6, UK-8	- Preparation of reporting documents for the internship and preparation of the report.	4.00	Report Protection
		- Final conference.	2.00	Performance, test in practice
Total			108.00	Credit with a grade

7. Methodical recommendations for students on the passage of practice

7.1. Use of the material of the educational and methodological complex of practice

At the first stage, it is necessary to familiarize yourself with the structure of the internship, mandatory types of work and reporting forms, which are reflected in the Methodological Guidelines for the organization and conduct of practice, developed at the department.

For the successful completion of tasks on industrial operational practice, the student needs to independently study the presented sources of literature in detail

No p/n	Type of independent work	Recommended sources of information (No source)			
		Main	Additional	Methodical	Internet Resources
1	Collection, processing and systematization of factual and literary material	1, 2, 3	1, 2, 3, 4, 5	1, 2	1, 2, 3, 4
2	Formulation of the problem, implementation of all stages of solving the problem, collection and preliminary processing of initial data, development of algorithms and programs, calculations	1, 2, 3	1, 2, 3, 4, 5	1, 2	1, 2, 3, 4
3	Preparation of the report	1, 2, 3	1, 2, 3, 4, 5	1, 2	1, 2, 3, 4

7.2. Fund of Assessment Tools for Practice

The Fund of Assessment Tools (FAT) for industrial operational practice is based on a list of mastered competencies with an indication of the stages of their formation in the process of internship. FAT provides objective control over the achievement of planned training outcomes. FAT includes:

- description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales;
- methodological materials that determine the procedures for assessing knowledge, skills, and (or) experience of activity, characterizing the stages of competence formation;
- standard control tasks and other materials necessary to assess knowledge, skills and the level of mastery of the formed competencies in the process of internship.

The FAT is an appendix to this internship program.

8. Educational, methodological and information support of practice

8.1. Recommended reading

8.1.1. Reference citations:

1. Katunin G.P. Telecommunication Systems and Networks. In 3 volumes. [Electronic resource]: textbook / G. P. Katunin, G. V. Mamchev, V. N. Popantonopulo [and others]. – Electron. dan. – Moscow: Hot Line-Telecom, 2014. – 672 p. – Mode of access:

http://e.lanbook.com/books/element.php?pl1_id=63223.

2. Krukhmalev V. V., Gordienko V. N., Mochenov A. D. edited by A. D. Mochenov. - 2nd ed., revised and supplemented - Moscow: Hot Line - Telecom, 2014. - 372 p.

3. Akulinichev, Y.P. Theory and Technique of Information Transmission: Textbook / Yu.P. Akulinichev, A.S. Berngardt. - Tomsk: Tomsk State University of Control Systems and Radioelectronics, 2014. - 209 p.: ill. tabl., schemes. - ISBN 978-5-4332-0035-7; The same [Electronic resource]. - URL: <http://biblioclub.ru/index.php?page=book&id=208952>

8.1.2. Further reading:

1. Kuritsyn S. A. Telecommunication Technologies and Systems: Textbook. Textbook / S. A. Kuritsyn. - Moscow: Academy, 2008. - 298 p. : ill. - (Higher Professional Education. Radio Engineering) (Textbook). - Refs.: p. 295. - ISBN 978-5-7695-2999-3.

2. Shpakov P. S., Yunakov Y. L. Mathematical processing of measurement results: a textbook / Publisher: Siberian Federal University, 2014. - URL: http://biblioclub.ru/index.php?page=book_red&id=435837&sr=1

3. Gordienko V. N. Optical Telecommunication Systems. [Electronic resource] : textbook / V. N. Gordienko, V. V. Krukhmalev, A. D. Mochenov [i dr.]. - Electron. dan. - Moscow: Goryachaya liniya-Telekom, 2011. - 368 p. - Mode of access: http://e.lanbook.com/books/element.php?pl1_id=5147

4. Bitner V.I. Networks of the new generation – NGN. – Moscow: Goryachaya liniya – Telekom, 2011. – 226 p.

5. Nefedov E.I. Antenna-feeder devices and radio wave propagation. Moscow, Akademiya Publ., 2010. 320 p. (in Russian).

8.1.3. Methodical literature:

1. Regulations on the organization and conduct of student practices in the Federal State Autonomous Educational Institution of Higher Education "North Caucasus Federal University". - Stavropol: NCFU, 2018.

2. "Pre-diploma industrial practice": guidelines for the passage of practice / compiled by M.V. Samus. - Stavropol: NCFU, 2023. - 13 p.: ill. (electronic VAR).

8.1.4. Internet resources:

1. <http://www.labcenter.com/index.cfm>.

2. <http://www.chipinfo.ru>.

3. <http://www.intuit.ru> – National Open University "INTUIT".

4. <http://www.edu.ru>.

8.2. Software:

1. Computer program "MathCAD".

2. NI Multisim 12 Virtual Simulation System.

8.3. Material and technical support of the internship

Specialized computer class with MS Windows XP/7/8/10, MS Office 2003/2007/2010 operating system and NI Multisim 12 NI Lab environment installed.

8.4 Features of the development of practice by persons with disabilities:

If there are students with disabilities, this practice is adapted taking into account the recommendations of the psychological, medical and pedagogical commission, the individual rehabilitation program of the disabled person and is carried out at the Department of Infocommunications of the University.