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MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution
Higher Education
"NORTH CAUCASUS FEDERAL UNIVERSITY"

APPROVED BY

Acting Director of the Institute
Advanced Engineering
Cand. Tech. Sci., Associate Professor
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WORK PROGRAM OF THE DISCIPLINE

Principles and Techniques of Information Security

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

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1. Purpose and objectives of mastering the discipline (module)

The purpose of studying the discipline "Principles and Techniques of Information Security" is the understanding by the future graduate of the role of secure storage and use of data in the information system and preparedness in the context of information security. The purpose of the discipline is to master basic knowledge in the field of information protection of information systems and networks based on modern software and operating systems and active equipment.

The objectives of the discipline are the study of software and hardware means of information security, methods of analysis and planning of information protection of computer systems, networks and their components, means of protection of network services.

2. Place of the discipline (module) in the structure of the educational program

The discipline Principles and Techniques of Information Security belongs to the main part of Block 1, B1.O.32.

3. List of planned learning outcomes in the discipline (module) correlated with the planned results of the development of the educational program

Code, formulation of competence	Indicator code, wording	Planned learning outcomes in the discipline (module), characterizing the stages of the formation of competencies, indicators
OPK-3. Able to apply methods of search, storage, processing, analysis and presentation of information from various sources and databases in the required format, while observing the basic requirements of information security	ID-1 OPK-3 understands the basic patterns of information transmission in infocommunication systems, the main types of signals used in telecommunication systems, the features of the transmission of various signals through channels and paths of telecommunication systems.	Understands and uses the basic principles, protocols and software cryptographic tools for ensuring information security of information and communication systems.
	ID-2 OPK-3 understands the principles, basic algorithms and devices of digital signal processing; the principles of building telecommunication systems of various types and methods of information distribution in communication networks.	Understands the general principles of operation and architecture of hardware, software and software and hardware of the administered network; channel protocols,
	ID-3 OPK-3 solves data processing problems using computer technology.	Uses software, hardware and software and hardware to protect network devices from unauthorized access.
	ID-4 OPK-3 builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model.	Connects and configures modern remote access security tools (operating systems and specialized protocols).

	ID-5 ОПК-3 has methods and skills for ensuring information security.	Installs additional software products to ensure the security of information and communication systems.
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4. Scope of the academic discipline (module) and forms of control *

Scope of classes: total: 5 EC 180 acad.h.	OFO, In acad. hours
Contact work:	32.00/0
Lectures/from them practical training	no
Laboratory work/from them practical training	no
Practical training/of which practical training	32.00
Independent work	148.00
Forms of control	
Exam	no
Credit	Yes
Credit with a grade	no
Course work	no

5. The content of the discipline (module), structured by topics (sections) with an indication of the number of hours and types of classes

№	Section (topic) of the discipline and summary	Emerging competencies, indicators	Full-time			Independent work, hours	Current Forms control Academic Performance
			Contact work of students with the teacher / of them in the form of practical training, hours				
			Lectures	Practical exercises	Laboratory work		
1	Topic 1. Basics of information security. 1. The concept of information security. 2. The main components of information security. 3. The importance and complexity of the problem of information security.	OPK-3 ID-1 OPK-3 understands the basic patterns of information transmission in infocommunication systems, the main types of signals used in		4		18	Interview

	4. Scenarios for the implementation of threats to information security. Practical lesson No1. Using classical cryptoalgorithms of substitution and permutation to protect textual information.	telecommunication systems, the features of the transmission of various signals through channels and paths of telecommunication systems. ID-2 OPK-3 understands the principles, basic algorithms and devices of digital signal processing; the principles of building telecommunication systems of various types and methods of information distribution in communication networks.					
2	Topic 2. Security of computer systems. 1. Traditional approach to the analysis of information security problems. 2. The object-oriented approach is a promising principle for analyzing information security issues. Practical lesson No2. Study of various methods of protecting textual information and their strength based on key selection.	OPK-3. ID-3 OPK-3 solves data processing problems using computer technology. ID-4 OPK-3 builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model. ID-5 OPK-3 has methods and skills for ensuring information security		4		18	Interview
3	Topic 3. Basic definitions and criteria for classification of threats. 1. Basic concepts of threats.	OPK-3 ID-1 OPK-3 understands the basic patterns of information		4		18	Interview

	2. The most common accessibility threats. 3. Major threats to integrity. 4. Main threats to privacy. Practical Lesson No3. Aes Symmetric Encryption Standard Rijndael.	transmission in infocommunication systems, the main types of signals used in telecommunication systems, the features of the transmission of various signals through channels and paths of telecommunication systems.					
4	Topic 4. Levels of information security. 1. Legislative level of information security. 2. Standards and specifications in the field of information security. 3. Administrative level of information security. 4. Procedural level of information security. Practical lesson No4. Study of the structure and principle of operation of schiff-Enigma machine.	ID-4 OPK-3 builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model. ID-5 OPK-3 has methods and skills for ensuring information security		4		18	Interview
5	Topic 5. Basic software and hardware measures to ensure information security. Basic software and hardware measures to ensure information security. 1. Basic concepts of the software and hardware level of information security. 2. Features of modern information systems that are essential in ensuring information security. 3. Security system architecture. Practical Lesson No5. Generating Prime Numbers Used in	OPK-3 ID-4 OPK-3 builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model. ID-5 OPK-3 has methods and skills for ensuring information security		4		18	Interview

	asymmetric encryption systems.						
6	Topic 6. Cryptographic protection of information. 1. Basic principles of cryptographic protection of information. 2. Hardware and software cryptographic means of information protection. Practical lesson No6. Electronic digital signature.	OPK-3 ID-4 ^{OPK-3} builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model. ID-5 ^{OPK-3} has methods and skills for ensuring information security		4		18	Interview
7	Topic 7. Cryptographic protection of information. 1. Asymmetric cryptosystems. 2. Symmetric cryptosystems. Practical Lesson No7. Encryption by the Sliding Permutation Method In the 19th century, the	OPK-3 ID-1 ^{OPK-3} understands the basic patterns of information transmission in infocommunication systems, the main types of signals used in telecommunication systems, the features of the transmission of various signals through channels and paths of telecommunication systems.		4		18	Interview
8	Topic 8. Malware and computer viruses. 1. Basic concepts and classification of malware. 2. Basics of fighting malware. 3. Comprehensive anti-virus protection tools. Practical lesson No8. Corrective codes.	OPK-3 ID-4 ^{OPK-3} builds probabilistic models for specific processes, carries out the necessary calculations within the framework of the built model. ID-5 ^{OPK-3} has methods and skills for ensuring information security		4		22	Interview

	TOTAL			32.00		148.00	
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6. Fund of assessment tools for the discipline (module)

The Assessment Tools Fund (WF) for a discipline (module) is based on a list of mastered competencies with an indication of indicators. The FAT provides objective control over the achievement of the planned learning outcomes. The 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) work experience that characterize the stages of competence formation (included in the methodological guidelines for those types of work that are provided for by the curriculum and provide for the assessment of the formation of competencies);
- standard assessment tools necessary for assessing knowledge, skills and the level of competence formation.

The FAT is an appendix to this program of the discipline (module).

7. Methodical instructions for students on the development of the discipline

Starting work, each student should take into account the following provisions.

The discipline (module) is built on a thematic principle, each topic is a logically complete section.

The lecture material is devoted to the consideration of the key, basic provisions of the courses and the explanation of educational tasks submitted for independent work of students.

Laboratory work is aimed at gaining practical experience in the relevant subject area.

Independent work of students is aimed at independent study of additional material, preparation for practical and laboratory classes, as well as the performance of all types of independent work.

For the successful development of the discipline, it is necessary to perform all types of independent work, using the recommended sources of information.

8. Educational, methodological and information support of the discipline

8.1. List of basic and additional literature necessary for mastering the discipline (module)

8.1.1. List of basic literature:

1. Prokhorova O.V. Information Security and Information Protection Elektronnyi resurs [Information Security and Information Protection] / Prokhorova O.V. - 2nd ed., ispr. - St. Petersburg: Lan, 2020. - 124 p. - ISBN 978-5-8114-4404-5, unlimited copies.

2. Shangin V.F. Informatsionnaya bezopasnost' i zashchita informatsii [Elektronnyi resurs] [Information security and information protection]. — Elektron. tekstovye dannye. — Saratov: Profobrazovaniye, 2017. — 702 c. — 978-5-4488-0070-2. — Mode of access: <http://www.iprbookshop.ru/63594.html>, unlimited copies.

3. Nesterov S.A. Osnovy informatsionnoy bezopasnosti [Elektronnyi resurs]: ucheb-noe posobie [Fundamentals of information security]: textbook / Nesterov S.A. — Elektron. tekstovye dannye [Text data]. — St. Petersburg: Peter the Great St. Petersburg Polytechnic University, 2014. — 322 c. — 978-5-7422-4331-1. — Access Mode: <http://www.iprbookshop.ru/43960.html>, Unlimited Copies..

8.2. List of educational and methodological support for students' independent work in the discipline (module)

1. Information Security and Information Protection Elektronnyi resurs / Minzov A.S., Bobyleva S.V., Osipov P.A., Popov A.A.: Practicum. - Dubna: State University "Dubna", 2020. - 85 p. - Recommended by the Educational and Methodological Council of the University "Dubna" as a workshop for students studying in the areas of training "System Analysis and Control", "Applied Informatics", "Applied Mathematics and Informatics (Master's degree)". - ISBN 978-5-89847-608-3, unlimited copies.

2. Sagdeev K.M. Physical Foundations of Information Protection. Manual: Direction of Training 10.03.01 - Information Security. Bachelor's Degree / K. M. Sagdeev, V. I. Petrenko, A. F. Chipiga; Sev.-Kav. Feder. University. - Stavropol: NCFU, 2015. - 394 p., unlimited copies.

3. Shangin V.F. Zashchita komp'yuternoy informatsii [Protection of computer information]. Effective methods and means [Elektronnyi resurs] / V. F. Shangin. – Electron. tekstovye dannye [Text data]. – Saratov : Pro-fobrazovaniye, 2017. — 544 c. — 978-5-4488-0074-0. — Mode of access: <http://www.iprbookshop.ru/63592.html>, unlimited ex-zemplars.

4. Shayakhmetov O.Kh. Information Security: A Textbook. – Stavropol: NCFU Publishing House, 2022. – 372 p. [electronic version]. - Unlimited copies.

8.3. List of resources of the information and telecommunication network "Internet" necessary for mastering the discipline (module)

National Open University INTUITH / Website. - <http://www.intuit.ru/>

www.biblioclub.ru - Electronic Library System "University Library Online"

www.fstec.ru – FSTEC of Russia website

www.eLibrary.ru - Scientific Electronic Library

www.iprbookshop.ru - IPRbooks Electronic Library System

<https://elibrary.ru/> - Official website of the scientific electronic library.

9. List of information technologies used in the implementation of the educational process in the discipline (module), including a list of software and information reference systems

When reading lectures, computer equipment is used, demonstrations of presentation multimedia materials. At seminars and practical classes, students present presentations prepared by them during the hours of independent work.

Information reference systems:

Information and reference and information and legal systems used in the study of the discipline:

1	Single window of access to educational resources: [portal]. URL: http://window.edu.ru/
2	National Open University INTUIT. URL: http://www.intuit.ru/

Software:

1	Viola Workstation 10
2	Alt Workstation K
3	Viola "Server"
4	Office software package - P7-Office

10. Description of the material and technical base necessary for the implementation of the educational process in the discipline (module)

Lectures	Classroom for training sessions, equipped with multimedia equipment and technical teaching aids.
Laboratory Classes	A classroom equipped with equipment and technical means for the presentation of educational information: - 1-element magnetic marker board 120x240; - Epson short-throw multimedia projector with wall mounting; - 15 workstations consisting of: computer – Lenovo Idea Centre all-in-one PC ((i5-3330s-2.7 / RAM 4Gb / Hdd 1Tb; video card 615M / DVD / keyboard / mouse. Connection to the Internet, access to the corporate network of the university.

Independent work	Room for independent work of students, equipped with computer equipment with the ability to connect to the Internet and the ability to access the electronic information and educational environment of the university
Practical training	It is carried out in the structural divisions of the university and (or) in organizations that carry out activities in the profile of the relevant educational program, including its structural subdivision

11. Features of mastering the discipline (module) by persons 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 (assistant) who provides students with the necessary technical assistance, as well as the services of sign language interpreters and typhlo-sign interpreters.

The development of a discipline (module) by students with disabilities can be organized together with other students, as well as in separate groups.

The development of a discipline (module) by students with disabilities is carried out taking into account the characteristics of psychophysical development, individual capabilities and health status.

In order to ensure the accessibility of higher education under the educational program by persons with disabilities when mastering the discipline (module), the following is ensured:

1) for visually impaired persons:

- the presence of an assistant who provides the student with the necessary technical assistance, taking into account individual characteristics (helps to take a workplace, move, read and complete the task, including by writing down by dictation),
- written tasks, as well as instructions on the procedure for their implementation, are drawn up in enlarged font,
- special textbooks, teaching aids and didactic materials (with large print or audio files),
- individual uniform lighting of at least 300 lux,
- if necessary, the student is provided with a magnifying device to complete the task;

2) for persons with hearing disabilities:

- the presence of an assistant who provides the student with the necessary technical assistance, taking into account individual characteristics (helps to take a workplace, move, read and complete the task, including by writing down by dictation),
- the availability of sound-amplifying equipment for collective use is ensured, if necessary, the student is provided with sound-amplifying equipment for individual use;
- is provided with appropriate sound means of reproducing information;

3) for persons with disabilities with musculoskeletal disorders (including those with severe disorders of the motor functions of the upper extremities or the absence of upper limbs):

- written tasks are performed on a computer with specialized software or dictated to an assistant;
- At the request of the student, tasks can be performed orally.

12. Features of the implementation of the discipline using distance educational technologies and e-learning

According to Part 1 of Article 16 of the Federal Law of December 29, 2012 No 273-FZ "On Education in the Russian Federation", *e-learning* is understood as the organization of educational activities with the use of information contained in databases and used in the implementation of educational programs and information technologies, technical means, as well as information and telecommunication networks that ensure the transmission of this information through communication lines, the interaction of students and teachers. Distance *educational technologies* are understood as educational technologies implemented mainly with the use of information and telecommunication networks with indirect (at a distance) interaction between students and teachers.

The discipline can be implemented using distance learning technologies and e-learning in whole or in part. The components of the discipline's teaching materials (the discipline's work program, assessment and methodological materials, forms of certification), implemented using distance learning technologies and e-learning, contain an indication of their use.

When organizing educational activities with the use of distance educational technologies and e-learning, asynchronous and synchronous ways of interacting with participants in educational relations through the information and telecommunication network "Internet" may be provided.

When using distance learning technologies and e-learning, the schedule for the discipline indicates: ways of interaction between participants in educational relations through the information and telecommunication network "Internet" (videoconferencing, ET - electronic testing); links to the electronic information and educational environment of NCFU, to educational platforms and resources of other organizations to which open access is provided through the information and telecommunication network "Internet"; for synchronous learning - the time of online classes and teachers; for asynchronous learning - the authors of online courses.

When organizing interim certification using distance learning technologies and e-learning, the Methodological Recommendations for the Use of Technical Means That Ensure the Objectivity of Results in the Conduct of Interim and State Final Certification in Educational Programs of Higher Education - Bachelor's Degree Programs, Specialist Programs and Master's Degree Programs with the Use of Distance Educational Technologies (Letter of the Ministry of Education and Education of Russia dated 07.12.2020 No MN-19/1573-AN "On the Direction of Methodological Recommendations") are used.

The implementation of the discipline using e-learning and distance learning technologies is carried out using the electronic information and educational environment of NCFU, to which students have access through the information and telecommunication network "Internet", or using the resources of other organizations, including platforms that provide services for video conferences, online meetings and distance learning (MTS-Link), as well as using the capabilities of social networks for communication between students and teachers.

Educational and methodological support of the discipline implemented with the use of e-learning and distance educational technologies includes a work program, teaching aids or a course of lectures presented in electronic form, guidelines for the implementation of various types of educational activities of students provided for by the discipline, and other educational materials posted in the information and educational environment of NCFU.