

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
Grobova T.A.

ASSESSMENT TOOLS FUND FOR DISCIPLINE

Frontier Lectures on Electronic Information Engineering / Лекции по передовым достижениям
в области электронной информационной инженерии

Direction of training	02.04.01 Mathematics and Computer Science
Directionality (profile)	Training Program for Electronic Information
Year of commencement of studies	2026
Form of study	full-time
Implemented in a semester	1

Preface

1. The purpose of conducting ongoing monitoring of academic performance and midterm assessment in the discipline Frontier Lectures on Electronic Information Engineering / Лекции по передовым достижениям в области электронной информационной инженерии "

2. FOS is an appendix to the program of the discipline Frontier Lectures on Electronic Information Engineering / Лекции по передовым достижениям в области электронной информационной инженерии "

3. Developer: Maria Vasilievna Valueva – Associate Professor of the Department of Computational Mathematics and Cybernetics, Candidate of Technical Sciences.

4. An examination of the FOS was carried out

Members of the expert group:

Chairman:

Poddubnaya N.A. – Chairman of the Teaching and Methodological Committee of the Faculty of Mathematics and Computer Science named after Professor N.I. Chervyakov

Members of the commission:

Gladkov A.V. – member of the teaching and methodological committee of the Department of Computational Mathematics and Cybernetics;

Andrukhiv L.V. – member of the teaching and methodological committee of the Department of Mathematical Modeling;

Kopytkova L.B. – member of the teaching and methodological committee of the department of mathematical analysis, algebra and geometry.

Representative of the employer organization: Lapin V.G. – Head of the Automated Control System Department of the Stavropol Regional Clinical Consultative and Diagnostic Center.

Expert opinion: the fund of assessment tools is recommended for assessing the level of development of competencies during ongoing monitoring of academic performance and midterm assessment of students in the discipline **“Frontier Lectures on Electronic Information Engineering / Лекции по передовым достижениям в области электронной информационной инженерии”** .

April 15 , 2026

5. The validity period of the FOS is determined by the period of implementation of the educational program.

Description of criteria for assessing competence at various stages of its development, description of assessment scales

Competence(s), indicator(s)	Levels of development of competencies,			
	The minimum level has not been reached (Unsatisfactory) 2 points	Minimum level (satisfactorily) 3 points	Intermediate level (Fine) 4 points	High level (excellent) 5 points
<i>Competence: OPK-1</i>				
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.	fragmentary knowledge of the tasks of the digital public services insufficient skills in describing digital filters using a difference equation and a transfer function insufficient knowledge of digital signal processing methods	knowledge of individual tasks of the digital public service skills in describing individual digital filters using a difference equation and a transfer function knowledge of digital signal processing methods in a positional system	knowledge of the main tasks of the digital public service skills in describing the main types of digital filters using a difference equation and a transfer function knowledge of digital signal processing methods in positional systems and residual class systems.	confident knowledge of the tasks of the digital public service skills in describing digital filters using a difference equation and a transfer function Confident mastery of digital signal processing methods in positional systems and residual class systems.
<i>UK-3</i>				
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	Fragmentary understanding of neural network algorithms for digital signal processing, which does not allow for the exploration of new and comparison of existing mathematical models. weak understanding of the adequacy of neural network models and digital signal processing poor knowledge of the basic characteristics of filters, which does not allow one to evaluate their quality	Basic understanding of neural network algorithms for digital signal processing, allowing for comparison of various mathematical models. The concept of the adequacy of neural network models and digital signal processing knowledge of individual criteria for assessing the performance quality of digital filters	Knowledge of neural network algorithms for the operation of the main blocks of digital filtering, allowing the exploration of new and comparison of existing mathematical models. Evidence-based representation of the adequacy of neural network models and digital signal processing knowledge of criteria for assessing the performance quality of digital filters	Comprehensive knowledge of neural network algorithms for the operation of the main blocks of digital filtering, allowing one to explore new and compare existing mathematical models, improve and develop concepts and methods. An

				evidence-based representation of the adequacy of neural network models and digital signal processing systems, allowing for the improvement and development of neural network filters confident knowledge of the criteria for assessing the performance of digital filters, allowing for their comparative analysis
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The assessment of the level of development of competence in the discipline is carried out on the basis of the “Regulations 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 federal state autonomous educational institution of higher education "North Caucasus Federal University" in the current version.

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF DEVELOPMENT OF COMPETENCIES

Task number	Correct answer	Contents of the question	Competence
		Semester 4	
1.	d)	The distinctive features of scientific research are: a) purposefulness b) search for something new c) systematicity d) strict proof e) all of the listed signs	OPK-1 UK-3
2.	A)	The main function of the method: a) internal organization and regulation of the cognitive process b) search for common features in a number of individual phenomena c) achieving results	OPK-1 UK-3
3.	A)	- is a set of techniques, operations and methods of theoretical knowledge and practical transformation of reality in achieving certain results. a): method b): principle c) experiment g): development	OPK-1 UK-3
4.	A)	- is a field of research activity aimed at obtaining new knowledge about nature, society, and thinking. a) science b) approbation c) concept d) theory	OPK-1 UK-3
5.	A)	- this is a doctrine about the principles, forms, methods of cognition and transformation of reality , the application of the principles of worldview to the process of cognition, spiritual creativity and practice. a) methodology b) ideology c) analogy d) morphology	OPK-1 UK-3

6.	A)	The design of the study is... a) the main idea that links together all the structural elements of the methodology, determines the order of the study, its stages b) literary presentation of research results c) accumulation of factual material	OPK-1 UK-3
7.	V)	a) epistemological b) transformational c) epistemological and transformational	OPK-1 UK-3
8.		Strategy of scientific research.	OPK-1 UK-3
9.		Tactics of scientific research.	OPK-1 UK-3
10.		Features of scientific research in the field of education management.	OPK-1 UK-3
11.		Principles of scientific knowledge of problems in the subject area of professional activity.	OPK-1 UK-3
12.		Methodological requirements for the conclusions of scientific research.	OPK-1 UK-3
13.		Classification and characteristics of scientific research methods.	OPK-1 UK-3
14.		Problems of interpretation of the obtained results.	OPK-1 UK-3
15.		Criteria and indicators for assessing the quality of scientific research.	OPK-1 UK-3
16.		The concept of scientific research effectiveness.	OPK-1 UK-3
17.		Relevance of the research topic, its main markers.	OPK-1 UK-3
18.		Scientific novelty of the research.	OPK-1 UK-3
19.		Scientific integrity of the researcher and the problem of plagiarism.	OPK-1 UK-3

20.		The specifics of presenting scientific text in the form of theses, articles and speeches.	OPK-1 UK-3
21.		The importance of scientific discussion in developing the author's position.	OPK-1 UK-3
22.		The difference between the author's position and the abstract presentation.	OPK-1 UK-3
23.	G)	Purposeful cognition, the results of which appear in the form of a system of concepts, laws and theories, is called a) scientific theory b) scientific practice c) scientific method d) scientific research	OPK-1 UK-3
24.	V)	The object of scientific research is a) something that remains to be discovered, proven, something unknown in science b) what the author of a scientific study fails to do c) the source of information necessary for the research d) a more specific source of information needed for the study	OPK-1 UK-3
25.			OPK-1 UK-3
26.	A)	The purpose of scientific research is a) a brief and precise statement of what the author intends to do within the framework of the research b) clarification of the problem, specifying the main idea c) the source of information necessary for the research d) something that remains to be discovered, proven, something unknown in science	OPK-1 UK-3
27.	A)	The topic of scientific research is a) clarification of the problem, specifying the main idea b) something that remains to be discovered, proven, something unknown in science c) the source of information necessary for the research d) a more specific source of information needed for the study	OPK-1 UK-3
28.	V)	The hypothesis of scientific research is a) clarification of the problem, specifying the main idea b) something that remains to be discovered, proven, something unknown in science	OPK-1 UK-3

		c) a hypothetical judgment about the natural (causal) relationship of phenomena d) the source of information necessary for the research	
29.	G)	The method of scientific research is a) a system of sequential actions, a research model b) preliminary generalizations and conclusions c) a temporary assumption for systematization of the available factual material d) research method, method of activity	OPK-1 UK-3
30.	A)	The methodology of scientific research is a) a system of sequential actions, a research model b) preliminary generalizations and conclusions c) a temporary assumption for systematization of the available factual material d) research method, method of activity	OPK-1 UK-3
31.	A)	The purposeful study of objects, which is based mainly on data from the senses (sensation, perception, representation) is a) observation b) experiment c) comparison d) theorization	OPK-1 UK-3
32.	V)	The cognitive operation that underlies judgments about the similarity or difference of objects is a) observation b) experiment c) comparison d) theorization	OPK-1 UK-3
33.	G)	Observation as one of the main empirical methods of scientific research is a) active and targeted intervention in the course of the process being studied b) a cognitive operation that underlies judgments about the similarity or difference of objects c) mental abstraction from unimportant properties and connections and simultaneous selection of one or more aspects of the object of study that are of interest to the researcher; d) purposeful study of objects, which is based mainly on data from the senses (sensation, perception, representation).	OPK-1 UK-3
34.	G)	When considering the content of the concept of “science”, the following approaches are used: a) structural b) organizational	OPK-1 UK-3

		c) functional d) structural, organizational and functional	
35.	G)	Based on the results of its activities, science can be: a) fundamental b): applied c) in the form of developments d) fundamental, applied and in the form of developments	OPK-1 UK-3
36.	A)	The main goals of scientific policy in the education system are: a) training of scientific and pedagogical personnel b) improving the scientific and methodological support of the educational process c) improving the planning and financing of scientific activities d) all of the listed goals	OPK-1 UK-3
37.	V)	The main sources of funding for research work in universities are: a) local budget b) federal budget c) extra-budgetary funds	OPK-1 UK-3
38.	A)	The Russian Ministry of Education pays primary attention to funding scientific research work: a) fundamental b) applied c) developments	OPK-1 UK-3
39.	b)	In the system of the Ministry of Education of the Russian Federation, special attention is paid to scientific and technical programs (STP): a) federal target programs b) programs of the Ministry of Education of Russia c) programs of other ministries d) regional programs	OPK-1 UK-3
40.	d)	The methodology of scientific research is: a) a system of consistently used techniques in accordance with the purpose of the study b) a system and sequence of actions for studying phenomena and processes c) a set of theoretical principles and methods for studying reality d) a way of understanding the objective world through consistent actions and observations d) all of the listed definitions	OPK-1 UK-3

41.	G)	In the formation of scientific theory, an important role is given to: a) induction and deduction b) abduction c): modeling and experiment d) all the listed instruments	OPK-1 UK-3
42.	A)	- is a form of spiritual activity of people aimed at producing knowledge about nature, society and knowledge itself, with the direct goal of comprehending the truth and discovering objective laws based on the generalization of real facts in their interrelationships, in order to foresee the trends in the development of reality and contribute to its change. a) science b) hypothesis c) theory d) concept	OPK-1 UK-3
43.	A)	The science or complex of sciences in which research is conducted is... a) scientific direction b) scientific theory c) scientific concept d) scientific experiment	OPK-1 UK-3
44.	A)	The basis of any science is. a) terminology, professional vocabulary b) common spoken language	OPK-1 UK-3
45.	b)	A method of scientific knowledge based on the procedure of combining various elements of a subject into a single whole, a system, without which truly scientific knowledge of this subject is impossible: a) Analysis b) Synthesis c) Induction d) Deduction	OPK-1 UK-3
46.	V)	A method of cognition in which the meaning obtained during the examination of one object is transferred to another, less studied and currently being studied: a) Observation b) Experiment c): Analogy d) Synthesis	OPK-1 UK-3
47.	A)	A method of scientific knowledge based on the study of any objects through their	OPK-1

		models : a) Modeling b) Analogy c) Experiment d) Synthesis	UK-3
48.	G)	A method of scientific knowledge that consists of moving from some general premises to particular results and consequences: a) Analysis b) Synthesis c) Induction d) Deduction	OPK-1 UK-3
49.	V)	The function of science in society is a) creation of a literate, "smart" society b) building effective social functioning c) description, explanation and prediction of processes and phenomena of reality on the basis of the laws discovered by it (science) d) creation of a basis for further scientific research	OPK-1 UK-3
50.	b)	Abstraction as a general logical method of research is a) dividing an object into its constituent parts for the purpose of their independent study b) mental abstraction from unimportant properties and connections and simultaneous selection of one or more aspects of the object of study that are of interest to the researcher c) a method of cognition, as a result of which the general properties and characteristics of objects are established d) a method of cognition, the content of which is a set of techniques for connecting individual parts of an object into a single whole	OPK-1 UK-3
51.	A)	Induction as a general logical method of research is a) a set of cognitive operations as a result of which the movement of thought from less general positions to more general ones is carried out b) the use of general scientific principles in the study of specific phenomena c) dividing an object into its constituent parts for the purpose of their independent study d) a method of cognition, the content of which is a set of techniques for connecting individual parts of an object into a single whole	OPK-1 UK-3
52.	d	What does it mean to "make a decision"?	OPK-1

		a) consider all possible alternatives b) consider several alternatives that provide the most effective solutions to the problem c) give an order to select a possible alternative d) give orders for the implementation of a specific plan	UK-3
53.	c	a) The more subordinates you have, the easier it is to work. b) 15-30 people c) 7-12 people d) 3-5 people	OPK-1 UK-3
54.	a	In management, the earned trust that a leader enjoys from subordinates, superiors , and coworkers is called... a) authority b) by the authorities c) influence d) leadership	OPK-1 UK-3
55.		What is meant by the term information technology?	OPK-1 UK-3
56.		What is the difference between information systems and information technology?	OPK-1 UK-3
57.		How can you protect yourself from the often-occurring problems of broken - formatting and incorrect fonts when viewing a presentation on another computer?	OPK-1 UK-3
58.		When working with a presentation in MS In PowerPoint, selecting Format, Slide Design allows you to ...	OPK-1 UK-3
59.	d	Artificial intelligence methods are based on... a) relational algebra b) quantum theory c) proving theorems d) heuristic techniques	OPK-1 UK-3
60.		List the main advantages of the Internet.	OPK-1 UK-3
61.		What is called the Internet Protocol.	OPK-1 UK-3
62.		What do people use to search for information online? What are the most commonly used Russian search engines?	OPK-1 UK-3

63.		What is compilation in IT ?	OPK-1 UK-3
64.		What are the main characteristics of an open personal computer architecture? What does it include ?	OPK-1 UK-3
65.		What do users ask to search for information on the Internet using search engines?	OPK-1 UK-3
66.	a	One of the search engines on the Internet is... a) Google b) THE BAT c) Gov.ru d) FileSearch	OPK-1 UK-3
67.	d	The problem of establishing a correspondence between the symbolic name of an Internet node and its IP address is solved using the name service. a) attributive b) network c) service d) domain	OPK-1 UK-3
68.		What is called infographic?	OPK-1 UK-3
69.		What is the name of the component part of a presentation that contains various objects?	OPK-1 UK-3
70.	c	F5 key in MS PowerPoint matches the command... a) call the Help Menu b) slide properties c) slideshow d) animation settings	OPK-1 UK-3
71.		What is meant by Design Template when creating presentations?	OPK-1 UK-3
72.		What is PowerPoint?	OPK-1 UK-3
73.	a	To create/edit a presentation template, you need to configure a) slide sample b) presentation design c) sample notes	OPK-1 UK-3

		d) presentation parameters	
74.		What fonts are recommended for high-quality perception of presentation text?	OPK-1 UK-3
75.		What is the purpose of PNG (.png), JPEG (jpg), GIF (.gif) formats when creating presentations?	OPK-1 UK-3
76.	a, b, c, d	Name the software products and services for creating presentations a) Microsoft PowerPoint b) Google Slides c) Prezi d) Canva e) Adobe Photoshop f) Microsoft Publisher	OPK-1 UK-3
77.		What is machine code?	OPK-1 UK-3
78.		Explain the term "software reliability"	OPK-1 UK-3
79.		What is software testing?	OPK-1 UK-3
80.		What is a flowchart?	OPK-1 UK-3
81.		What is an algorithm in programming?	OPK-1 UK-3
82.		What are variables in programming?	OPK-1 UK-3
83.		What are reserved words in programming?	OPK-1 UK-3
84.		What are variables in programming?	OPK-1 UK-3
85.		What types of algorithms are there?	OPK-1 UK-3
86.		What is the main purpose of writing a resume?	OPK-1 UK-3
87.		What are the main qualities required of an employee that a resume should display?	OPK-1

			UK-3
88.		What is meant by professional development?	OPK-1 UK-3
89.		Applying a design approach to creating a professional personal development plan consists of the following steps: ...	OPK-1 UK-3
90.	G)	In the formation of scientific theory, an important role is given to: a) induction and deduction b) abduction c): modeling and experiment d) all the listed instruments	OPK-1 UK-3
91.		Name the most well-known career planning technologies, including those common in modern Russian practice.	OPK-1 UK-3
92.		The introduction should state: a) relevance of the topic b) the results obtained c) the sources on which the work was written d) issues of testing the proposed development.	OPK-1 UK-3
93.		The correct sequence of the stages of the abstract: a) title page-table of contents-introduction-main content-conclusion-bibliography-appendices; b) title page-introduction-table of contents-main content-conclusion-bibliography-appendices; c) title page-table of contents-introduction-main content-bibliography-conclusion-appendices; d) title page - table of contents - introduction - main content - conclusion - appendices - list of references.	OPK-1 UK-3
94.		The application is: a) part of the text of the WRC; b) material that is not related to the text of the final qualifying work; c) supplementation of the final qualifying work text; d) additional information.	OPK-1 UK-3
95.		The completed final qualifying work is submitted:	OPK-1

		a) to the scientific supervisor; b) to the head of the department; c) to the reviewer; d) to a specialist of the organization in which the work was performed.	UK-3
96.		The choice of research topic is determined by: a) relevance; b) reflection of the theme in literature; c) the interests of the researcher; d) at the direction of the teacher.	OPK-1 UK-3
97.		A brief description of the work is presented: a) in the introduction; b) in the annotation; c) in content; d) in conclusion.	OPK-1 UK-3

2. Description of the rating scale

Under the rating system, student performance in each discipline is assessed through ongoing assessments and midterm assessments. The rating system for assessing student knowledge is based on a set of assessment activities (checkpoints) optimally spaced throughout the course. The principles of the rating system for assessing student knowledge are based on the requirements described in the Regulation on the Organization of the Educational Process Based on the Rating System for Assessing Student Knowledge at North Caucasus Federal University.

The rating system of assessment is not provided for students studying in educational programs at the master's level of higher education, for students studying in educational programs at the bachelor's level of higher education in part-time and full-time forms of study.

3. Competency assessment criteria

The grade "**excellent**" is awarded if the student, when answering questions at both the basic and advanced levels, demonstrates a deep and comprehensive knowledge of the subject, required and additional literature, presents the material in a reasoned and logical manner, using mathematical symbols, can apply knowledge to analyze specific situations, and is freely oriented in interdisciplinary connections.

The grade "**good**" is given if, when answering the questions of the basic part, the student demonstrates knowledge of the subject, required literature, familiarity with additional literature, presents the material in a reasoned manner, is able to apply knowledge to analyze specific situations, but slightly violates the sequence of presentation of the material, provides an insufficiently complete, although correct, definition of concepts.

The grade "**satisfactory**" is given if, when answering the questions of the basic part, the student has shown that he basically knows the subject, the required literature, can practically apply his knowledge, but presents the program material fragmentarily and inconsistently, makes individual mistakes and errors in the application of mathematical symbols and concepts, and is poorly oriented in interdisciplinary connections.

The grade "**unsatisfactory**" is given if the student does not answer the basic questions asked of him or his answer shows that the main content of the subject has not been mastered, ignorance of most of the educational material is revealed, gross errors are made in the formulation of theorems, definition of basic concepts, or mathematical symbols are used incorrectly.