

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
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**ASSESSMENT TOOLS FUND FOR DISCIPLINE
PRINCIPLES OF COMMUNICATIONS / ПРИНЦИПЫ КОММУНИКАЦИИ**

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	3

Introduction

1. Purpose: The assessment tools fund for the discipline "Principles of Communications / Принципы коммуникации" is intended for conducting current and midterm assessment of students in the training program 02.04.01 Mathematics and Computer Science in order to check the quality of the formation of competencies UK-5, PC-8.

2. FOS is an appendix to the discipline (module) program «Principles of Communications / Принципы коммуникации»

3. Developer D.V. Gaichuk , Associate Professor of the Department of Infocommunications

4. An examination of the organophosphorus compounds was carried out.

Members of the expert group:

Chairman G.I. Linets, Head of the Department of Infocommunications

N.Yu. Bratchenko, Associate Professor of the Department of Infocommunications

Yakovlev S.V., Associate Professor of the Department of Infocommunications

Expert opinion: The FOS for the discipline allows us to assess the level of development of competencies.

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

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

Competence (ii), indicator (s)	Levels of development competence (s),			
	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: UK-5 Capable analyze and take into account the diversity of cultures in the process of intercultural interaction</i>				
outcomes for the course (module): <i>Indicator:</i> ID-1 UK-5 A 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	Unable to complete tasks related to this competency achievement indicator	Performs tasks related to this competency achievement indicator at the reproductive level	Performs tasks related to this competency achievement indicator in standard situations, making minor errors	Completes tasks related to this competency achievement indicator in full, including in non-standard situations
<i>Competency: PC-8 Able to participate in the management of projects for the creation of information systems and software systems at various stages of the life cycle</i>				
outcomes for the course (module): <i>Indicator:</i> 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	Unable to complete tasks related to this competency achievement indicator	Performs tasks related to this competency achievement indicator at the reproductive level	Performs tasks related to this competency achievement indicator in standard situations, making minor errors	Completes tasks related to this competency achievement indicator in full, including in non-standard situations

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF DEVELOPMENT OF COMPETENCIES

Task number	Correct answer	Contents of the question	Competence
1.	EQUIPMENT COMPLEX	Telecommunication networks represent _____ and software tools that ensure the transmission of information messages between subscribers with specified quality parameters	UK-5, PC-8
2.	1)	In networks with _____, a connection is first established between subscribers, and then messages are transmitted over the established connection. <i>Please select one of 3 answer options:</i> 1) channel switching 2) packet switching 3) message switching	UK-5, PC-8
3.	2)	Is the statement true: Since the communication channel is completely dedicated to a pair of subscribers, it is impossible to set the required parameters and characteristics for it, ensuring the values of delay and delay variation <i>Please select one of the two answer options:</i> 1) yes 2) no	UK-5, PC-8
4.	1-a 2-b	Match the definitions <i>Indicate the match for all 2 answer options:</i> 1) belong to users (subscribers) 2) address devices, usually interfaces of telecommunication nodes and subscriber devices a)__ Logical addresses b)__ Physical addresses	UK-5, PC-8
5.	THE ROUTE IS BEING	Virtual channel technologies involve pre-connecting the end nodes (source and	UK-5,

	PLANNED	destination) to a _____ (virtual channel) over which data is then transmitted.	PC-8
6.	1-a 2-b	Specify what is characteristic of the technologies under consideration <i>Indicate the match for all 2 answer options:</i> 1) receipt of data is confirmed by the receiving party. 2) individual parts of a large message can be transmitted via different routes and the loss of an individual part of the message may go unnoticed a)__ Virtual channel technologies b)__ Datagram technology	UK-5, PC-8
7.	PRELIMINARY CONNECTION	In datagram technology there are no _____ end nodes	UK-5, PC-8
8.	1-a 2-b 3-c 4-d 5th 6-f 7-g	Compare the functional purpose of the levels <i>Please indicate the correct answer for all 7 options:</i> 1) operates on the most common unit of data—the message. This layer manages network access, data flow, and network services (protocols) such as FTP, TFTP, HTTP, SMTP, SNMP, and others. 2) The data is converted into the generally accepted ASCII format. When receiving data, the reverse process occurs. Data encryption and compression (MPEG and JPEG protocols) also occur at this level. 3) determines which computer is the master and which is the slave, sets the transmission time for the transmitting side. 4) The layer ensures reliable delivery of packets. 5) addresses the message, determines the route along which the data packet will be sent 6) At this level, a checksum, determined using a cyclic code algorithm, is added to the transmitted data. On the receiving end, the checksum is used to detect errors.	UK-5, PC-8

		7) transmits a bit stream over the appropriate physical medium (electrical or optical cable, radio channel) through the appropriate interface. a)___ Level Application Layer 7 b)__ Presentation Level Layer 6 c)__ Session level (Session Layer) 5 d)__ Transport layer (Transport Layer 4 e)__ Network layer (Network Layer 3 f)__ Data Link Layer (Data Link) 2 g) __ Physical layer (Physical) 1	
9.	1-a 2-b 3-c 4-d	Match the elements of data encapsulation <i>Please indicate the correct answer for all 4 options:</i> 1) segment 2) data 3) package 4) frame a)__ Transport layer b)__ Application layer c)__ Network layer d)__ Data Link Layer	UK-5, PC-8
10.	1-a 2-b 3-c	Match the address and protocol data unit types <i>Please indicate the match for all 3 answer options:</i> 1) port numbers 2) logical IP addresses 3) physical addresses a)__ Segment b)__ Package	UK-5, PC-8

		c)__ Data frame	
11.	1) 2) 3)	Identify which layers of the OSI model correspond to the Application layer of the TCP / IP model <i>Select several of the 7 answer options:</i> 1) applications 2) representations 3) session 4) transport 5) network 6) channel 7) physical	UK-5, PC-8
12.	4	A UTP cable contains _____ pairs of twisted copper wires.	UK-5, PC-8
13.	2)	Which type of twisted pair provides the best protection for the transmitted signal from interference. <i>Please select one of the two answer options:</i> 1) UTP 2) STP	UK-5, PC-8
14.	1) 2) 3)	Straight cable is used for connections: <i>Select several of the 6 answer options:</i> 1) Switch with router 2) Switch with computers or servers 3) A hub with computers or servers 4) Switch with switch 5) Router with a computer 6) Computer to computer	UK-5, PC-8

15.	1) 2) 3)	The crossover cable is used for connections: <i>Select several of the 6 answer options:</i> 1) Switch with switch 2) Router with router 3) Computer to computer 4) Switch with router 5) Switch with computers or servers 6) Hub with computers or servers	UK-5, PC-8
16.	CONSOLE CABLE	To configure a switch or router, they are connected to a serial COM port (RS-232) on a personal computer. This uses _____	UK-5, PC-8
17.	FIBER TWISTING	The advantage of fiber optic cable is that there is no need for _____ or their shielding, since there are no problems with crosstalk and electromagnetic interference from external sources.	UK-5, PC-8
18.	CYLINDRICAL STRUCTURE	An optical fiber is a two-layer _____ in the form of a core (optical fiber) and a cladding.	UK-5, PC-8
19.	1-a 2-b	Compare <i>Indicate the match for all 2 answer options:</i> 1) the core diameter is relatively large 2) the light beam propagates through the core along the fiber axis a)__ multimode fiber b)__ single-mode fiber	UK-5, PC-8
20.	1550	The transparency windows of optical fiber are located at wavelengths of 850 nm , 1310 nm and _____ nm	UK-5, PC-8
21.	5	The wireless environment is formed by a set of radio channels grouped into several	UK-5,

		frequency ranges. Three frequency ranges: 900 MHz, 2.4 GHz, and ____ GHz, are recommended by the International Telecommunication Union (ITU) . Telecommunications Union - ITU).	PC-8
22.	1-a 2-b 3-c 4-d	Compare the parameters of Wi-Fi wireless transmission standards <i>Please indicate the correct answer for all 4 options:</i> 1) 5 GHz, 54 Mbps 2) 2.4 GHz, 11 Mbps 3) 2.4 GHz, 54 Mbps 4) 2.4GHz, 5GHz, 100Mbps a) __ 802.11a b) __ 802.11 b c) __ 802.11 g d) __ 802.11 n	UK-5, PC-8
23.	1-a 2-b	Bluetooth and WiMAX technology standards <i>Indicate the match for all 2 answer options:</i> 1) IEEE 802.15 standard network 2) IEEE 802.16 standard network a) __ Bluetooth b) __ WiMAX	UK-5, PC-8
24.		What are the LLC and MAC sublayers? Ethernet frame format .	UK-5, PC-8
25.		Local area networks using Ethernet technology are	UK-5, PC-8
26.		Switches in local networks: operating algorithm, switching modes	UK-5,

			PC-8
27.		The order of data exchange in a local network: transmission of packets within a local network, transmission of packets outside the local network	UK-5, PC-8
28.		General information about the ARP protocol is	UK-5, PC-8
29.		What are the problems with the ARP protocol?	UK-5, PC-8
30.		What are the tasks of the network layer?	UK-5, PC-8
31.		Give the characteristics of the IP protocol	UK-5, PC-8
32.		What is an IPv4 packet?	UK-5, PC-8
33.		What is an IPv6 packet?	UK-5, PC-8
34.		What are IPv4 network addresses?	UK-5, PC-8
35.		What are IPv6 network addresses?	UK-5, PC-8
36.		Routers in networking technologies are	UK-5, PC-8
37.		What are the routing principles?	UK-5, PC-8

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.

3. Competency assessment criteria

An “excellent” grade is awarded to a student if he/she fully and accurately completes the assessment tools tasks for the discipline related to the given competence (indicators of achievement of competence), while demonstrating at a high level the ability to solve standard and non-standard applied practical problems of the physical principles of telecommunications.

A “good” grade is given to a student if he or she completes, with minor errors, the assessment tools tasks for the discipline related to the given competence (indicators of achievement of competence), while demonstrating at an average level the ability to solve only standard applied practical problems of the physical principles of telecommunications.

A “satisfactory” grade is given to a student if he/she completes, with errors that are corrected with the help of the teacher’s leading questions, the assessment tools tasks for the discipline related to the given competence (indicators of achievement of competence), while demonstrating at a minimum level the ability to solve standard applied practical problems of the physical principles of telecommunications.

The grade "unsatisfactory" is given to a student if he/she, while completing the assignments of the assessment tools for the discipline, does not achieve the minimum level of competence (indicators of achievement of competence), and at the same time does not demonstrate the ability to solve standard applied practical problems of the physical principles of telecommunications, makes gross errors that he/she cannot correct even with the help of leading questions from the teacher.