KSPEU

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Budgetary Educational Institution of Higher Education
«KAZAN STATE POWER ENGINEERING UNIVERSITY»
(FSBEI HE «KSPEU»)

APPROVED
Director of the Institute of Digital Technologies and Economics
_____Zainullin R.R.
«24»_____**February**_____2026

WORKING PROGRAM OF THE DISCIPLINE

B1.M.11.01 Information technology

Field of training 38.03.02 Management

Qualification Bachelor's Degree

Kazan, 2026

The program was developed:

Name of the department	Должность, уч.степень, уч.звание	ФИО разработчика
ITIS	Senior lecturer	Bikeeva N.G.
ITIS	Candidate of Pedagogical Sciences, Associate Professor	Kutsenko S.M.

Approval	Name of the unit	Date No.	Date No.	Date No.
Approved	ITIS	18.02.2026	№ 2	_____ Head of the Department, Candidate of Technical Sciences, Associate Professor Solovyov S.A.
Agreed	Management	10.02.2026	Protocol №5	_____ Head of the Department, Doctor of Sociology, Professor Makhiyanova A.V.
Agreed	Educational and Methodological Council of the Institute of Digital Technologies and Economics	24.03.2026	№ 7	_____ Director, Candidate of Technical Sciences, Associate Professor Zainullin R.R.
Approved	Academic Council of the Institute of Digital Technologies and Economics	24.03.2026	№ 7	_____ Director, Candidate of Technical Sciences, Associate Professor Zainullin R.R.

1. Purpose, objectives and planned results of training in the discipline

The purpose of mastering the discipline "Information Technologies" is to teach students the basic concepts, models and methods of information technology.

The objectives of the discipline are: practical development of information technologies (and tools) for solving typical general scientific tasks in their professional activities and for organizing labor.

Competencies and indicators generated by students:

Competence code and number	Indicator code and number
GPC-6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC-6.1 Knows and understands the principles of modern information technologies

* GPC - general professional competencies

2. Place of discipline in the structure of OP

Previous disciplines (modules), practices, research, etc. - no.

Subsequent disciplines (modules), practices, research, etc.: Information and digital technologies, Performance and protection of final qualification work

3. Structure and content of the discipline

3.1. discipline structure

For full-time education

Type of educational work	Total credits	Total hours	semester
			2
TOTAL LABOR INVOLVEMENT OF THE DISCIPLINE	2	72	72
CONTACT WORK*	-	40	40
AUDITORIUM WORK	1	36	36
Lectures	0,5	18	18
Practical (seminar) classes	-	-	-
Laboratory work	0,5	18	18
STUDENT'S INDEPENDENT WORK	1	36	36
Study of the educational material	1	36	36
Course project	-	-	-
Course work	-	-	-
Preparation for intermediate certification	0	0	0
Intermediate certification:			3

For part-time education

Вид учебной работы	Всего ЗЕ	Всего часов	Семестр
			2

TOTAL LABOR INVOLVEMENT OF THE DISCIPLINE	1	72	72
CONTACT WORK*	-	47	47
AUDITORIUM WORK	1,12	10	40
Lectures	0,56	20	20
Practical (seminar) classes	-	-	-
Laboratory work	0,56	20	20
STUDENT'S INDEPENDENT WORK	0,88	32	32
Study of the educational material	0,78	28	28
Course project	-	-	-
Course work	-	-	-
Preparation for intermediate certification	0,11	4	4
Intermediate certification:			3

3.2. The discipline content is structured by sections and types of activities

Sections of the discipline	Всего часов	Distribution of labor intensity by type of academic work				Forms and type of control	Indices of indicators of formed competencies
		lectures	laboratory work.	practical exercises	independent work.		
Section 1. Modern information technologies. End-to-end digital technologies.	9	4	-	-	5	CC-1 (current control)	GPC -6.1 k GPC -6.1 c
Section 2. Technical means of implementing information processes.	14	6	-	-	8	CC-2	GPC -6.1 k1,k2, c
Section 3. Software means of implementing information processes	32	4	18	-	10	CC-1, CC-2, CC-3	GPC -6.1 k2,c1, c3,o1
Section 4. Technologies for ensuring the security of information processing	7	2		-	5	CC-3	GPC -6.2 k3, c2
Section 5. Network technologies for data processing. Components of computing networks	10	2		-	8	CC-3	GPC -6.2 k4, c1, o1, o2
Test	0	-	-	-	-	-	-

TOTAL	**72**	**18**	**18**	**-**	**36**		

3.3. Content of the discipline Section

1. Modern information technologies. End-to-end digital technologies. End-to-end digital technologies. Types of end-to-end technologies. Technologies and sub-technologies. Trends in the Internet of Things, digital twins. Digital transformation of enterprises on the example of the fuel and energy complex. Digital energy (overview). Section

2. Technical means of implementing information processes. History of the development of computer technology. The concept and main types of computer architecture. Principles of computer operation. Composition and purpose of the main computer elements and their characteristics. Units of information measurement. Coding of information (numeric, sound, graphic, video) in a computer.

Section 3. Software tools for implementing information processes Classification of software. Types of software and their characteristics. System software. Operating systems of the Windows, Linux, Android, and iOS families. Application software. Programming systems. Windows file systems (NTFS, FAT32), Linux file systems (ext4). Section

4. Technologies for ensuring the security of information processing. Information protection. Software and hardware tools for protecting information. A systematic approach to information protection. Computer viruses and information security. Cryptographic means of information protection.

Section 5. Network technologies of data processing. Components of computing networks. Network technologies of data processing. Components of computing networks. Model of interaction of open systems OSI. Classification of computer networks. Principles of organization and basic topologies of computing networks. Devices of switching of computers in networks. Global networks. Information protection in networks.

3.4. Thematic plan of practical classes

This type of work is not provided by the curriculum.

3.5. Thematic plan of laboratory works

Laboratory work 1. Fundamentals of working in an office suite of application programs. Working with text and objects in the text. Complex formatting of text.

Laboratory work 2. Working with spreadsheets. Formats for presenting data. Processing numerical information. Using standard functions to solve problems. Autofilling and links. Creating reports. Sales. Rent and salary. Creating graphs.

Laboratory work 3. Working with spreadsheets. Sorting and filtering. Combining (consolidating) and linking tables in MS Excel. Forecasting in MS Excel. Laboratory work

4. Working with spreadsheets. Using financial functions. Viewing reference and array functions. Script manager

3.6. Course project / term paper

This type of work is not provided by the curriculum.

4. Assessment of learning outcomes

The assessment of learning outcomes in the discipline is carried out as part of the current control and intermediate certification, which are conducted using the point-rating system (PRS).

Assessment scale for learning outcomes in the discipline:

Competence code	Competence indicator code	Planned learning outcomes for the discipline	The level of development of the competence indicator			
			Tall	Average	Below average	Низкий
			from 85 to 100	from 70 to 84	from 55 to 69	from 0 to 54
			Assessment scale			
			excellent	good	satisfactory	unsatisfactory
			credited			not counted
GPC-6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC-6.1 Knows and understands the principles of modern information technologies	To know (knows):				
		to know:data representation formats in a computer; the principles of modern information technologies (k1)	Shows full knowledge of the principles of modern information technology	He is well aware of the principles of modern information technology and makes minor inaccuracies.	Makes a lot of mistakes. Has a poor understanding of how modern information technologies work	There are gross errors. The level of knowledge is less than the nominal requirement.
		technical and software tools for implementing information processes; (k2)	Fully aware of the technical and software tools used to implement information processes, and does not make mistakes	Shows good knowledge of technical and software tools for implementing information processes	Makes many mistakes when using software and performs poorly on a computer	Knowledge below the minimum requirements allows for many gross errors
		basic information security requirements; (k3)	Fully understands the basic requirements of information security and does	Shows good knowledge of basic information security requirements, but	Makes many mistakes in information security definitions	Does not know the basics of information security

			not make mistakes	makes mistakes		
		tools for working with information in global computer networks (k4)	He has a full understanding of how to work with information in global computer networks and does not make mistakes.	Shows good knowledge of how to work with information in global computer networks, but makes mistakes	It does not work well in local and global networks	Knowledge below the minimum requirements
		be able to (can):				
		receive, store, and process information using a computer.(c1)	He is highly skilled in receiving, storing, and processing information using a computer.	Can receive, store, and process information using a computer, with minor errors	Partially demonstrates the ability to receive, store, and process information using a computer, with many errors	Unable to receive, store, and process information using a computer
		understand the types of malware and how to deal with them (c2)	He is well-versed in the types of malware and how to deal with them.	He is well-versed in the types of malware and how to deal with them.	Makes many gross mistakes when using information, computer, and network technologies.	He is unable to use information, computer, and network technologies to work with information.
		conduct calculations using application office packages (c3)	Demonstrates a high level of proficiency in conducting calculations using application office packages	Can perform calculations using application office packages. Makes mistakes when solving problems.	Makes many mistakes when solving problems using application office packages	Does not know how to perform calculations using application office packages.
		own:				
		information processing methods.(o1)	He has a high level of	He is well-versed in information	Makes many mistakes	Has no information

			proficiency in information processing methods.	processing methods and makes minor mistakes.	when using information processing methods	processing skills.
		skills in working with information in global computer networks (o2)	He has excellent skills in working with information in global computer networks.	Well-versed in working with information in global computer networks	Makes many mistakes when working with information in global computer networks	No skills in working with information in global computer networks

The assessment materials for conducting current control and intermediate certification are given in the Appendix to the working program of the discipline.

The full set of tasks and materials necessary for evaluating the learning outcomes of the discipline is stored at the developer's department.

Текст : электронный // Лань : электронно-библиотечная система. — URL: https://e.lanbook.com/book/180821 (дата обращения: 21.03.2023). — Режим доступа: для авториз. пользователей.

2. Хлебников А. Информационные технологии : учебник / Хлебников А., А. — Москва : КноРус, 2022. — 465 с. — ISBN 978-5-406-08923-1. — URL: https://book.ru/book/942103 (дата обращения: 21.03.2023). — Текст : электронный.

3. Абдуллаева О. Информационные технологии. Практикум : учебное пособие / Абдуллаева О., С. — Москва : Русайнс, 2023. — 119 с. — ISBN 978-5-466-00813-5. — URL: https://book.ru/book/945249 (дата обращения: 21.03.2023). — Текст : электронный.

5.1.2. Дополнительная литература

1. Зубова, Е. Д. Информационные технологии в профессиональной деятельности : учебное пособие для вузов / Е. Д. Зубова. — Санкт-Петербург : Лань, 2022. — 212 с. — ISBN 978-5-8114-9347-0. — Текст : электронный // Лань : электронно-библиотечная система. — URL: https://e.lanbook.com/book/254681 (дата обращения: 21.03.2023). — Режим доступа: для авториз. пользователей.

2. Абдуллаева О. Информационные технологии : учебник / Абдуллаева О., С., Исомиддинов А., И., Абдуллаева С. Х. — Москва : Русайнс, 2022. — 189 с. — ISBN 978-5-4365-8803-2. — URL: https://book.ru/book/943449 (дата обращения: 21.03.2023). — Текст : электронный.

3. Информационные технологии в вопросах и ответах : учебное пособие для вузов / Б. В. Черников. - М. : Финансы и статистика, 2005. - 320 с. : ил. - ISBN 5-279-02909-2. - Текст : непосредственный.

5.2. Information support

5.2.1. Electronic and Internet resources

№ п/п	Naming of electronic and Internet resources	Link
1	Electronic library system "Lan"	https://e.lanbook.com/
2	Electronic library system "ibooks.ru"	https://ibooks.ru/
3	Electronic library system "book.ru"	https://www.book.ru/
4	Open Education Portal	https://npoed.ru

5	Russian National Library	https://nlr.ru/
6	Cyber Leninka	https://cyberleninka.ru
7	Technical Library	https://techlibrary.ru
8	National Electronic Library (NEL)	https://rusneb.ru/

5.2.2. Professional databases / Information and reference systems

№ n/n	Name of professional databases	Address	Access mode
1	Official Internet portal of legal information	http://pravo.gov.ru	http://pravo.gov.ru
2	Reference legal system "Consultant Plus"	http://consultant.ru	http://consultant.ru
3	Reference legal system on the legislation of the Russian Federation	http://garant.ru	http://garant.ru

5.2.3. Licensed and freely distributed software of the discipline

№ п/п	Software name	Description	Details of the supporting documents
1	Microsoft Windows 10 operating system	Custom operating system	Contract No. 133/2021 dated 12.10.2021, the licensor is Soft Line Trade CJSC, the type (kind) of the license is non-exclusive. right, the license is valid indefinitely
2	Microsoft Office 2019	Office application package	Contract No. 133/2021 dated 12.10.2021, the licensor is Soft Line Trade CJSC, the type (kind) of the license is non-exclusive. right, the license is valid indefinitely
3	LMS Moodle	Software for effective online interaction between teachers and students	Free license, license type (category) - non-exclusive. right, license term - unlimited.
4	Chrome browser	Internet information search system	Free license, license type (category) - non-exclusive. right, license term - unlimited.

6. Material and technical support for the discipline

Name of the type of academic work	Name of the classroom, specialized laboratory	List of required equipment and technical training tools
Lectures	Lecture-type classroom	Specialized educational furniture, technical training tools, serving to present educational

		information to a large audience (multimedia projector, computer (laptop), screen), demonstration equipment, educational visual aids
Laboratory work	Software Engineering Laboratory,	Specialized laboratory equipment in the profile of the software engineering laboratory, specialized educational furniture for 50 seats, 24 computers with the possibility of Internet access and providing access to EIEE (electronic information and educational environment) , technical training tools (multimedia projector, multimedia board, monoblock), the necessary licensed software
	room B-608	Specialized educational furniture for 42 seats, 17 computers with Internet access and EIEE access, technical training equipment (multimedia projector, projector screen, monoblock), and necessary licensed software
	Computer Lab,	Specialized laboratory equipment for the information security laboratory, specialized educational furniture for 35 seats, 15 computers with Internet access and EIEE access, technical training equipment (multimedia projector, multimedia board, monoblock), and necessary licensed software
	room B-610	Specialized educational furniture for 24 seats, 21 computers with Internet access and EIEE access, and necessary licensed software
	Information Security Laboratory,	Specialized educational furniture for 26 seats, 21 computers with Internet access and EIEE access, and the necessary licensed software
	room B-615	Specialized educational furniture for 35 seats, 13 computers with Internet access and EIEE access, and technical training equipment (multimedia projector, projector screen, and monoblock), and the necessary licensed software
	Computer Lab,	Specialized laboratory equipment for the reengineering and business process management laboratory, specialized educational furniture for 34 seats, 13 computers with Internet access and EIEE access, technical training equipment (multimedia projector, multimedia board, monoblock), and necessary licensed software
	room B-617	Specialized educational furniture for 30 seats, 30 computers, computers with Internet access and access to EIEE, technical training equipment (multimedia projector, laptop, screen), video cameras, and necessary licensed software
Independent work	Computer Lab,	Specialized educational furniture for 30 seats,

		30 computers, technical training equipment (multimedia projector, computer (laptop), screen), video cameras, and software
	room B-619	Specialized furniture, computer equipment with Internet access and EIEE access, screen, multimedia projector, and software

7. Features of the organization of educational activities for persons with disabilities and the disabled

Persons with disabilities (PWD) and the disabled have the opportunity to move freely from one educational and laboratory building to another, to climb all the floors of educational and laboratory buildings, to study in educational and other premises, taking into account the specifics of psychophysical development and health conditions.

For the training of persons with disabilities and the disabled, who have disorders of the musculoskeletal system, conditions for unhindered access to all educational premises are provided. Information about special conditions created for students with disabilities and impairments is available on the university's website www//kgeu.ru. Technical assistance can be provided by an assistant, and sign language and braille interpreters can be used.

The following conditions are provided to adapt reference and educational materials for students with disabilities and impairments who have hearing impairments:

- to better orient the audience, signals are used to announce the beginning and end of the lesson (the word "bell" is written on the blackboard);
- the attention of a hearing-impaired student is attracted by the teacher's gesture (a hand is placed on the shoulder, and a gentle tap is made);
- when talking to a student, the teacher looks at them and speaks clearly in short sentences, ensuring that they can read lips.

To compensate for the difficulties in the speech and intellectual development of hearing-impaired students, the following measures are taken:

- using schemes, diagrams, drawings, and computer presentations with hyperlinks that comment on individual components of the image;
- regularly using exercises to graphically highlight the essential features of objects and phenomena;
- providing students with the opportunity to receive targeted email consultations as needed.

To adapt the reference, educational, and informational materials provided by the educational program for the chosen field of study to the needs of individuals with disabilities and visual impairments, the following conditions are provided:

- the official website is adapted to meet the special needs of visually impaired individuals, and large-print information about the class schedule is provided;
- the teacher and their interlocutor (if necessary) are introduced to the students, and the person the teacher is addressing is named each time;
- the teacher's actions, gestures, and movements are briefly and clearly

explained;

- printed information is provided in large print (18 points or larger) and is fully audible;

- the required level of illumination of the premises is provided;

- the opportunity to use computers during classes and the right to record explanations on a dictaphone (at the request of students) is provided.

The form of conducting current and intermediate certification for students with disabilities and disabilities is determined by the teacher in accordance with the curriculum. If necessary, a student with disabilities, a disabled person, taking into account their individual psychophysical characteristics, is given the opportunity to pass intermediate certification orally, in writing on paper, in writing on a computer, in the form of testing, etc., or is given additional time to prepare an answer.

8. Methodological recommendations for teachers on the organization of educational work with students.

Methodological support for the educational process of students is one of the defining factors of high-quality education. A university teacher, demonstrating high professionalism, erudition, a clear civic position, self-discipline, and a creative approach to solving professional tasks, contributes to the formation of a harmonious personality during the educational process.

When implementing a discipline, a teacher can use the following methods of educational work:

- Methods of developing personal awareness (conversation, debate, suggestion, instruction, control, explanation, example, self-control, storytelling, advice, persuasion, etc.);

- Methods of organizing activities and developing behavioral experience (assignment, public opinion, pedagogical requirement, assignment, training, creating educational situations, training, exercise, etc.);

- Methods of motivating activity and behavior (approval, encouragement of social activity, reprimand, creating situations of success, creating situations for emotional and moral experiences, competition, etc.).

When implementing this course, the teacher must consider the following areas of educational activity:

Civic and patriotic education:

- formation of students' holistic worldview, Russian identity, respect for their family, society, state, spiritual, moral and socio-cultural values adopted in the family and society, for national, cultural and historical heritage, formation of the desire for its preservation and development;

- formation of an active civic position in students based on the traditional cultural, spiritual and moral values of Russian society, in order to increase the ability to responsibly exercise their constitutional rights and obligations;

- development of the legal and political culture of students, expansion of constructive participation in decision-making affecting their rights and interests,

including in various forms of self-organization, self-government, socially significant activities;

- the formation of motives, moral and semantic attitudes of the individual, which make it possible to resist extremism, xenophobia, discrimination on social, religious, racial, national grounds, interethnic and interfaith intolerance, and other negative social phenomena.

Spiritual and moral education:

- education of a sense of dignity, honor and honesty, conscientiousness, respect for parents, teachers, people of the older generation;

- formation of the principles of collectivism and solidarity, the spirit of mercy and compassion, the habit of caring for people in difficult life situations;

- building solidarity and a sense of social responsibility towards people with disabilities, overcoming psychological barriers towards people with disabilities;

- the formation of an emotionally rich and spiritually elevated attitude towards the world, the ability and ability to convey their aesthetic experience to others.

Cultural and educational education:

- formation of aesthetic picture of the world;

- formation of respect for the cultural values of the native city, region, country;

- increased cognitive activity of students.

Scientific and educational education:

- formation of a scientific worldview among students;

- formation of knowledge acquisition skills;

- formation of skills of information analysis and synthesis, including in the professional field.

Changes and approvals for the new academic year

№ п/п	Application Section No changes	Date of changes	The content of the changes	"Approved" Head of the Department that implements the discipline	"Approved" Chairman of the Educational and Methodological Council of the Institute (Faculty), which
1	2	3	4	5	6
1					
2					
3					

Appendix to the course syllabus

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MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Budgetary Educational Institution of Higher Education
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ASSESSMENT MATERIALS
for the discipline

B1.M.11.01 Information technology

Kazan, 2026

Assessment materials for the discipline, designed to assess the learning outcomes for compliance with the indicators of achieving competencies.

Assessment of the learning outcomes for the discipline is carried out as part of the current control (CC) and intermediate certification, carried out according to the point-rating system (PRS).

1.Technological map

Sections of the discipline	Forms and view control	Rating indicators							
		I current control	Additional points to CC1	II current control	Additional points to CC2	III current control	Additional points to CC3	Total	Interim assessment
Section 1. Modern information technologies. End-to-end digital technologies. Section 3. Software means of implementing information processes	**CC1**	**20**						**20**	**20**
Test (Section 1)		5							
Defense of laboratory work 1 (Section 3)		15							
Section 2. Technical means of implementing information processes. Section 3. Software means of implementing information processes	**CC2**			**25**				**25**	**25**
Test (Section 2)				5					
Test or written survey (Section 3)				5					
Defense of laboratory work 2,3 (Section 3)				15					
Section 3. Software means of implementing information processes Section 4. Technologies for ensuring the security of information processing Section 5. Network technologies for data processing. Components of computing networks	**CC3**					**55**		**55**	**55**
Test or written survey (Section 4)						5			
Test or written survey (Section 5)						5			
Defense of laboratory work 4 (Section 3)						15			
Completion of individual assignments (test) (section 3)						10			
Final test						20			
Total for 3 CC									**100**

2. Assessment materials for ongoing monitoring and midterm assessment

Learning outcome assessment scale for the discipline:

Competency code	Competency indicator code	Planned learning outcomes for the discipline	Level of development of the competency indicator			
			High	Average	Below Average	low level
			from 85 to 100	from 70 to 84	from 55 to 69	from 0 to 54
			Rating scale			
			excellent	good	satisfactory	unsatisfactory
			credited			not credited
GPC-6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC-6.1 Knows and understands the principles of modern information technologies	To know (knows):				
		to know:data representation formats in a computer; the principles of modern information technologies (k1)	Shows full knowledge of the principles of modern information technology	He is well aware of the principles of modern information technology and makes minor inaccuracies.	Makes a lot of mistakes. Has a poor understanding of how modern information technologies work	There are gross errors. The level of knowledge is less than the nominal requirement.
		technical and software tools for implementing information processes; (k2)	Fully aware of the technical and software tools used to implement information processes, and does not make mistakes	Shows good knowledge of technical and software tools for implementing information processes	Makes many mistakes when using software and performs poorly on a computer	Knowledge below the minimum requirements allows for many gross errors
		basic information security requirements; (k3)	Fully understands the basic requirements of information security and does not make mistakes	Shows good knowledge of basic information security requirements, but makes mistakes	Makes many mistakes in information security definitions	Does not know the basics of information security
		tools for working with information in global computer networks (k4)	He has a full understanding of how to work with information in global computer	Shows good knowledge of how to work with information in global computer networks,	It does not work well in local and global networks	Knowledge below the minimum requirements

			networks and does not make mistakes.	but makes mistakes		
		be able to (can):				
		receive, store, and process information using a computer.(c1)	He is highly skilled in receiving, storing, and processing information using a computer.	Can receive, store, and process information using a computer, with minor errors	Partially demonstrates the ability to receive, store, and process information using a computer, with many errors	Unable to receive, store, and process information using a computer
		understand the types of malware and how to deal with them (c2)	He is well-versed in the types of malware and how to deal with them.	He is well-versed in the types of malware and how to deal with them.	Makes many gross mistakes when using information, computer, and network technologies.	He is unable to use information, computer, and network technologies to work with information.
		conduct calculations using application office packages (c3)	Demonstrates a high level of proficiency in conducting calculations using application office packages	Can perform calculations using application office packages. Makes mistakes when solving problems.	Makes many mistakes when solving problems using application office packages	Does not know how to perform calculations using application office packages.
		own:				
		information processing methods.(o1)	He has a high level of proficiency in information processing methods.	He is well-versed in information processing methods and makes minor mistakes.	Makes many mistakes when using information processing methods	Has no information processing skills.
		skills in working with information in global computer networks (B2)	He has excellent skills in working with information	Well-versed in working with information in global	Makes many mistakes when working with	No skills in working with information in global computer

			in global computer networks.	computer networks	information in global computer networks	networks

The "excellent" grade is given for completing the calculation work in the semester; test tasks; a deep understanding of technological methods for calculating material consumption rates, complete and meaningful answers to ticket questions (theoretical and practical assignment);

The "good" grade is given for completing the calculation work in the semester; test tasks; understanding of technological methods for calculating material consumption rates, answers to ticket questions (theoretical or practical assignment);

The grade "satisfactory" is given for completing the semester's calculation work and test assignments.;

The grade "unsatisfactory" is given for poor and incomplete completion of the semester's calculation work and test assignments.

3. List of evaluation tools

A brief description of the assessment tools used in the ongoing monitoring of academic performance and intermediate certification of students in the discipline:

Name of the assessment tool.	Name of the assessment tool.	Name of the assessment tool.
Control work (KntR)	A tool for testing the ability to apply the acquired knowledge to solve problems of a certain type in a topic or section	A set of test tasks by options
Report on laboratory work (OLR)	The laboratory work ends with the submission of a report. The result of the laboratory work may be a file with completed tasks attached to the MOODL electronic environment or tasks completed in the laboratory work and submitted for review by the teacher.	A list of tasks and questions for the laboratory work defense, a list of requirements for the report
Test (Test)	A system of standardized tasks that allows for the automation of the procedure for measuring the level of knowledge and skills of the student	A set of test tasks

4. List of control tasks or other materials necessary to assess the knowledge, skills and abilities that characterize the stages of competencies formation in the process of mastering the discipline

Example of task

For the current control CC1:

Verified competence: GPC -6 Is able to understand the principles of modern information technologies and use them to solve professional tasks. OPC-6.1 Knows and understands the principles of modern information technologies.

Test

Question	*Answer options*
The development of the digital economy has been facilitated by	*digitalization of production*
	robotization of production
	automation of production
	transformation of production
The digital economy assumes that in the structure of GDP:	the industrial and service sector accounts for more than 60%
	the agricultural sector accounts for more than 90%
	the industrial sector accounts for more than 90%
	the service sector accounts for more than 60%
Increasing the speed of information exchange and its	digital population index
	digital literacy

application requires an increase in …	digitalization
	collaboration
Why is the concept of "end-to-end" used in the phrase "end-to-end digital technologies"?	due to the fact that these technologies are not associated with a specific product or field of activity, but can be applied in many industries
	due to the fact that these technologies have an end-to-end impact on digital technologies
Methods of storage in Big Data	Vertical model
	Decentralized model
	Centralized model
	Mixed model
	Horizontal model
The main end-to-end technologies	Global networks
	Universal services
	Big data
	Neurotechnology
	Smart home
	Sensory
Взаимосвязь данных в Big Data	Weak
	Strong
What is included in the architecture of intelligent robots:	Sensors
	Execution control system
	Action planning system
	Object modeling system
	Control system
	Action algorithm

Laboratory work 1. Fundamentals of working in an office application package. Working with text and objects in the text. Complex text formatting.

Given a text that needs to be edited according to the following requirements:

1. Text font
Size – 14
Type – Times New Roman
2. Paragraph
Line spacing – 1.5
Paragraph spacing – 0
Paragraph indentation (red line) – 1.27
3. Page parameters
Left – 3cm
Right – 1
Top\bottom – 2
4. Chapters (introduction, literature, contents) start on a new page. The font is bold.
5. Figures are centered, and the figure caption is centered
6. The main concepts are highlighted in bold
7. The formulas are edited.
8. The tables are edited. The font inside the table is 12 pt, and the line spacing is -1). The table names are centered
9. The page numbers are centered at the top, and pages 1 and 2 are not numbered.
10. Edit the content.
11. Edit the references

For the current control CC2:

Checked competence: GPC-6 Is able to understand the principles of operation of modern information technologies and use them to solve professional tasks. GPC-6.1 Knows and understands the principles of operation of modern information technologies

Test

Question	Answer options

A microprocessor is designed for...:	*Computer operation and data processing*
	Inputting information into the computer and outputting it to the printer
	Processing text data
	Working with databases
A processor whose architecture is based on a reduced set of supported commands and a large number of internal registers is called:	CISC architecture
	RISC architecture
	DISC architecture
	NTT architecture
The bitness of a microprocessor is:	the largest unit of information
	the number of bits that is perceived by the microprocessor as a single whole
	the smallest unit of information
	the bit size of the microprocessor's cache memory
The cache memory cells are:	field-effect transistors;
	flip-flops;
	microcapacitors;
	resistors
What determines the resolution of a bitmap image?	determined by the shape of the vertical dots per unit length of the image
	determined by the quality of the vertical dots per unit length of the image
	determined by the number of horizontal and vertical dots per unit length of the image
How many values does a discrete representation of a physical quantity take?	an infinite number of values
	2 values
	256 values
	a finite number of values
A spreadsheet cell block is defined by:	specifying the links to the first and last cell
	the names of the columns in the first and last cell
	the row numbers in the first and last cell
What is included in a computer's complete software?	*system, application*
	utilities
	games
	movies
What is included in system software?	*Operating systems, file managers, programming systems, antivirus programs*
	Applications are special.appointments, general purpose applications, learning programs, games
	Editing applications, writing applications, learning programs, shooting games
	Graphics applications, music applications, drawing programs, games
Which components are not part of the operating system?	*text editor*
	utilities
	software module
	device driver

Laboratory work 2. Working with spreadsheets. Data presentation formats. Processing numerical information. Using standard functions to solve problems. Autofilling and references. Creating spreadsheets. Sales. Rent and salary. Creating graphs.

Example of tasks.

Task 1.

1. Create a table using the sample
2. In the first row, combine the cells in columns A through M.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Примеры вариантов автозаполенния данными**												
2													
3	повтор	12	12	1	Тип 1	10.02.2020	10.02.2020	10.02.2020	10.02.2020	Понедельник	ПН	Январь	ЯНВ
4			15	2					17.02.2020				
5													
6													

.

3.In each of the columns, select the filled cells, move the cursor to the lower right corner of the cell (the cursor takes the form of " + " (the auto-fill marker)). After that, press the left button and, while holding it, "pull" the data to the 30th row.

4.To fill the G column with a repeating date, drag the data to the end of the selected table while holding down the left mouse button and the Ctrl key on your keyboard.

5.In the H column, drag the data to the end of the selected table while holding down the right mouse button. In the context menu that appears, select the Fill by business days option. Check how the cells are filled.

6. Save the changes you have made.

7. On the Sheet2 sheet, which you will name Relative References, create a table based on the sample.

8. Design the table header using the technology of combining multiple cells into one.

9. On other tabs, select the font, borders, etc.

10. For the column Payment per day, set the Money format

11. Fill in the table columns. Enter a formula to calculate the accrued amount, i.e. multiply the payment for one working day by the number of days worked. Fill in the entire column using the auto-fill marker.

12. Enter a formula to find the values in the Received column. Fill in the entire column using the auto-fill marker.

13. Use the data from the Total Accrued and Received columns to create a bar chart. Format the chart according to the sample.

14. To change the orientation of the surname signatures, select the signatures, then in the context menu (call it using the right mouse button), select the Axis Format item. In the Alignment tab, in the Text Direction item, select the desired option for the signature orientation.

15. Save the changes you have made.

16. On Sheet3, which you will rename to Absolute References, create a table using the following example:

17. Calculate the cost of the gasoline used by multiplying the gasoline consumption (in liters) by the cost of one liter of gasoline. For a cell with constant data, set absolute addressing. Copy the formula to the remaining cells in the table using the autofill marker. When you copy the formula, the contents of the cells with absolute addressing (the price of gasoline) will not change.

18. Fill in the cells of the TOTAL row.

19. Change the price of gasoline to the current price. See how the data in the table has changed.

20. Close your file and save your changes.

21. Create an MS Excel file called Time Sheet. On the Sheet1 sheet, which you will name Time Sheet, create a table using the following example:

22. Fill in the working days for October 2023.

23. Set a condition to validate the data entered in the cells.

24. Fill in the table by entering the payment (in rubles per hour). Try to enter values that are not within the specified range of 150 rubles to 300 rubles, and make sure that you cannot do so. In this way, the user can reduce the likelihood of errors when entering data.

25. Calculate the number of days each employee appears (without summing these numbers).

26. Autofill for the remaining employees.

27. Calculate the number of days each employee spent on vacation. To do this, use the COUNTIF function.

28. Similarly, calculate the number of days missed due to illness ("b"), as well as the number of days missed due to absenteeism ("a").

29. Fill in the column of hours worked (each workday lasts 8 hours) and

30. Calculated. Set the formulas yourself.

31. Create a pie chart that reflects the number of hours worked by each employee. Design the chart according to the sample below.

32. Create a volume bar chart that reflects the accrued amount for each employee. Design the chart according to the sample.

33. Save your changes.

34. On Sheet2, which you will name Sorting, create a table according to the sample.

35. Fill in all the empty columns and rows of the table by entering the necessary formulas.

36. Copy the filled-in table below three times.

37. Select the table rows except the TOTAL row and the column number, and sort them:

a) the first copied table by the columns Last name, First name, Middle name in alphabetical order (in the dialog box, use the Add level item);

b) the second copied table by the column January in descending order;

c) the third copied table by the column Amount to be issued in ascending order.

38. Highlight the sorted data in color.

39. Save the changes you have made.

40. Show the completed task to your teacher.

Task 2. Creating Statements

1. Create an MS Excel file named "Statements." On Sheet1, name it "Revaluation Statement," create a table using the following template:

2. Using the logical IF function, fill in the column for the k coefficient value according to the following condition:

k = 3.3, if FS 700 million rubles;

k = 4.2, if 700 million rubles FS 1,000 million rubles;

k = 5.1, if FS 1,000 million rubles.

First, enter the formula in cell E5, then copy it to the remaining cells in the column.

3. Fill in the remaining columns of the table using the following formulas: OS = FS – IO; IPR = FS*k; VOS = OS*k.

4. Create a histogram using the specified data and format it according to the template.

5. On Sheet2, which you name Reporting Statement, create a table using the template.

6. Fill out the table by manually defining the necessary formulas. To fill in the Total Revenue column, use the AutoSum button on the Home tab.

7. To fill in the Place and Average Revenue columns, use the RANK and AVERAGE statistical functions (Formulas tab Statistical category).

8. Fill out the last column by manually defining the formula.

9. Create your own custom data format. To do this, go to Number tab → All Formats (Home tab). In the Type field, enter the following structure: # ###,00" thousand rubles.

10. Apply this format to all data that represents monetary values.

11. Create a pie chart using the data in the last column.

12. Rename Sheet 3 to Payroll and create a spreadsheet on it using the template.

13. Fill in the remaining columns of the payroll using the appropriate formulas, functions, and autofill.

14. Fill in the Payroll Rate column using the logical IF function, taking into account the following rates: Lab Assistant – 15,670 rubles, Engineer – 28,500 rubles, Junior Employee – 25,700 rubles, Senior Employee – 29,700 rubles, Lab Manager – 31,500 rubles (first enter the formula in cell D5, checking the logical condition for only one cell, C5, then fill in the remaining cells in the column using the autofill handle).

15. Using the logical IF function, fill in column k, assigning the coefficient values based on the calculation: worked up to and including 5 years - 0.1, from 5 to 7 years inclusive - 0.15, from 7 to 10 years inclusive - 0.2, from 10 to 15 years inclusive - 0.25, over 15 years - 0.3.

16. Fill in the Length of Service Bonus and Total columns, setting the appropriate formulas for the calculations.

17. Fill in the Tax Percentage column using the logical IF function based on the values of the Total column in accordance with the following grid: income up to and including RUB 20,000 is taxed at 8%, income from RUB 20,000 to RUB 30,000 is taxed at 8%. Inclusive – 11%, from 30,000 rubles to 35,000 rubles inclusive – 13%, over 35,000 rubles – 15%.

18. Fill in the last two columns, manually entering the necessary calculation formulas.

19. Format the corresponding data as currency and percentage.

20. Create a custom data format that takes into account length of service: up to 5 years – data is presented in blue, from 5 to 10 years – in green, from 10 to 15 years – in red.

21. Create an error message in case of an erroneous entry of a negative number of years in the Length of Service column. On the Parameters tab, set the required condition.

22. For the same Tariff Rate field, create a message: "BE CAREFUL WHEN ENTERING THE TARIFF RATE!"

23. Create a histogram using the data in the last column.

24. Save your changes.

25. Show the completed assignment to your teacher.

Laboratory work 3. Working with spreadsheets. Sorting and filtering. Combining (consolidating) and linking tables in MS Excel. Forecasting in MS Excel.

Task 1. Sorting and filtering

Task 2. Combining (consolidating) and linking tables in MS EXCEL

For the current control CC1:

Verified competence: GPC -6 Is able to understand the principles of modern information technologies and use them to solve professional tasks. GPC -6.1 Knows and understands the principles of modern information technologies.

Тест

Question	Answer options
Computer viruses	are the result of errors in the operating system
	occur due to malfunctions in the computer's hardware
	are written by people specifically to cause damage to the user's PC
	are generated by incorrectly written software products
The distinctive abilities of a computer virus are	contain a significant amount of software code
	can be self-executed and can be copied multiple times...
	requires user intervention to launch
	is easily recognizable
Information protection is...	a set of measures aimed at ensuring information security.
	the process of developing a database structure according to user requirements
	a small program for performing a specific task
The routing protocol (IP) provides	the management of data transmission equipment and communication channels
	the preservation of the mechanical and functional parameters of physical communication in a computer network
	the interpretation of data and its preparation for the user level
	the delivery of information from the sending computer to the receiving computer
The configuration (topology) of a local network in which all workstations are connected to a server (file server) is called	star
	ring
	bus
	tree
A collection of computers connected by communication channels and located within one (or more) rooms or buildings is called	global computer network
	local computer network
	information system with hyperlinks
	email
Types of information security	Local, global, mixed
	Client, server, network
	Personal, corporate, government

The main reason for the existence of numerous information security threats is	curiosity and intrigues of ill-wishers
	miscalculations in the administration of information systems
	complexity of modern information systems
	actions of malefactors and hackers
The types of security threats (networks, systems) are	personal, corporate, social, national
	software, technical, organizational, technological
	server, client, satellite, ground
A method for decrypting encrypted information without a key designed for such decryption	hacking
	cryptography
	cryptanalysis

Laboratory work 4.

Working with spreadsheets. Using financial functions. Functions for viewing links and arrays. Script manager

Task_1. Calculate the amount that will be in the account if 55,000 RUB is invested in a bank for 8 years at 10.7% per annum with monthly interest accrual.

Task_2. Create a loan repayment plan if a loan of 1,000,000 RUB is issued for 5 years at 12.8% per annum.3. Calculate the monthly / annual payments for a 15-year mortgage loan of 3,500,000 RUB. at a 10.8% annual interest rate with a 25% down payment.

Task_4. Calculate the payback period of a certain investment project, if the investment will be 150,000,000 RUB by the beginning of income receipt, the discount rate is 8.5%, and the expected annual income from the project is 65,000,000 RUB.

Task_5. A bond with a face value of 300,000 RUB is issued for 7 years. The interest accrual is as follows: 10.3% in the first year, 12.4% in the next three years, and an increase of 0.3% in the remaining three years. Calculate the future value of the bond using the compound interest rate.

Task_6. The costs of the investment project will be 500 000 000 RUB. The expected revenues over the next 5 years will be 50 000 000 RUB, 100 000 000 RUB, 250 000 000 RUB, 200 000 000 RUB, 150 000 000 RUB, respectively. Estimate the economic feasibility of the project based on the investment turnover rate, if the market rate of return is 13.6%.

Control work

In each variant of the control work, there are three typical tasks. There are a total of 30 variants of tasks. Each student performs one variant of the task according to its number in the group journal.

List of tasks of the control work

Task 1.

1) Calculate and fill in the table of values of the function F(x) for different values of the argument x. Plot the graph of the given function.

The values of the constants: A = 3, B = 0.5; C = 12. The values of the argument x are 0.1; 0.2; 0.3; ……..1.1.

It is recommended to enter the numerical values of F(x) in the table with an accuracy of five digits.

2) Plot the graph of the given function.

3) Display the maximum and minimum values of the function in cells D8 and D9. Display the average value of the function in cell D10.

Use the Statistical functions MIN(), MAX(), and AVERAGE() for calculations.

Task 2.

1) Calculate the value of the function y= f (x) for the values of x. The domain of x, the step of change of the argument Δx and the value of the constant A are presented in the table.

The function y is defined by the equation:

$$y = \begin{cases} A \cdot \lg x + \sqrt{x} & при \quad x > 0 \\ 2 \cdot A \cdot \cos x + 3x^2 & при \quad x \le 0 \end{cases}$$

2) Plot the graph of the given function.

3) In cells D17 and D18, display the number of positive and negative values of the function.

Use the COUNTIF() function for calculations.

Task 3

Calculate the sum (product) of a number series according to the variant number. For a given number series, find:

1) The sum (product) of the members of the number series when their number is known in advance.

2) The sum (product) of the terms of a numerical series for a given accuracy of calculations (it is assumed that the given accuracy is achieved when the absolute value of the difference between two adjacent terms (multipliers) is less than the given accuracy).

The errors in calculating the sum (product) of the terms of a numerical series with a given accuracy (absolute and relative) in relation to the calculated sum (product) for a known number of terms in the numerical series.

The final test includes 20 questions from all sections of the course.