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

WORK PROGRAM FOR THE DISCIPLINE

B1.M.11.02 Algorithmization and programming

Field of training — 38.03.02 Management

Qualification — Bachelor's Degree

Kazan, 2026

The program was developed by:

Name of the Department	Position, academic degree, academic status	Last name, first name, patronymic of the developer
ITCS	Associate Professor, Candidate of Pedagogical Sciences, Associate Professor	Kutsenko S.M.
ITCS	Senior Lecturer	Bikeeva N.G.

Approval	Name of department	Date	Minute s No.	Signature
Approved	ITCS	18.02.26	2	_____ Head of Department, Candidate of Physical and Mathematical Sciences, Associate Professor Soloviev S.A.
Agreed	Management	10.02.26	5	_____ _Head of Department, Doctor of Sociological Sciences, Professor Makhiyanova A.V.
Agreed	Educational and Methodological Council of the Institute of Digital Technologies and Economics	24.02.26	6	_____ Director, Candidate of Technical Sciences, Associate Professor Zainullin R.R.
Approved	Academic Council of the Institute of Digital Technologies and Economics	24.02.26	6	_____ _____ Director, Candidate of Technical Sciences, Associate Professor Zainullin R.R..

1. Objective, tasks, and planned learning outcomes for the course

The objective of teaching the course "Information Technology" is to familiarize students with the basic concepts, models, and methods of information technology, the fundamental concepts of information theory, automation, and the Python programming language, as well as to solve problems related to ensuring information security for individuals, society, and the state.

The objectives of this course are: practical mastery of information technology for solving typical general scientific problems in one's professional activities and for work organization; mastery of a personal computer at the user level; mastery of a programming language and the company's information security policy; study of standards and regulatory documents in the field of information security.

Competencies and indicators developed in students:

Code and name of competence	Code and name of the indicator
GPC-5 Able to use modern information technologies and software tools, including the management of large data sets and their intelligent analysis, in solving professional tasks.	GPC-5.1 Able to apply modern information technologies and software tools in solving professional tasks
GPC-6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC-6.2 Possesses the skills to apply digital technologies to solve professional tasks, taking into account the basic requirements of information security

2. The place of the discipline in the structure of the educational program

Preceding courses (modules), internships, research, etc.: none
Subsequent courses and internships: Management Information Systems, Software and Programming in Professional Activities, Academic Internship (research work (acquiring basic research skills)), Industrial Internship (technological), State Final Certification, Preparation for the Defense Procedure and Defense of the Final Qualifying Thesis

3. Structure and content of the discipline

3.1. Structure of the discipline

For full-time education

Type of academic work	Total CU	Total hours	Semester 3
GENERAL WORK INTENSITY OF THE DISCIPLINE	3	108	108
CONTACT WORK *	-	49	49
AUDITING WORK	1	36	36
Lectures	0,5	18	18
Practical (seminar) classes		-	-
Laboratory work	0,5	18	18
INDEPENDENT WORK OF THE STUDENT	2	72	72
Processing of educational material	1	36	36
Course project	-	-	-
Coursework	-	-	-
Preparation for midterm assessment	1	36	36
Interim assessment:			E

For full-time and part-time education

Type of academic work	Total CU	Total hours	Semester 5
GENERAL WORK INTENSITY OF THE DISCIPLINE	3	108	108
CONTACT WORK *	-	48	48
AUDITING WORK	0,88	32	32
Lectures	0,44	16	16
Practical (seminar) classes	-	-	-
Laboratory work	0,44	16	16
INDEPENDENT WORK OF THE STUDENT	2,11	76	76
Processing of educational material	1,86	67	67
Course project	-	-	-
Coursework	-	-	-
Preparation for midterm assessment	0,25	9	9
Interim assessment:			E

For correspondence courses

Вид учебной работы	Всего ЗЕ	Всего часов	Семестр
			3
GENERAL WORK INTENSITY OF THE DISCIPLINE	3	108	108
CONTACT WORK *	-	28	28
AUDITING WORK	0,28	10	10
Lectures	0,11	4	4
Practical (seminar) classes	-	-	-
Laboratory work	0,17	6	6
INDEPENDENT WORK OF THE STUDENT	2,72	98	98
Processing of educational material	2,47	89	89
Course project	-	-	-
Coursework	-	-	-
Preparation for midterm assessment	0,25	9	9
Interim assessment:			E

3.2. The content of the discipline, structured by sections and types of classes

Sections of the discipline	Total hours	Distribution of labor intensity by type of academic work				Forms and types of control	Indices of indicators of developing competencies
		Lectures	Laboratory work	пр. зан.	Practical classes		
Topic 1 Programming Technologies	**8**	4			4		ОПК-5.3, ОПК-5.3, ОПК-5.3
Topic 2 Linear Programs in Python	**10**	2	2		4	ТК1	ОК-3.3, ОК-3.У, ПК-11.3 ПК-11.У
Topic 3 Branching in Python	**10**	2	2		4	ТК2	**ОК-3.3, ОК-3.У, ПК-11.3 ПК-11.У**
Topic 4 Loops in Python	**10**	2	4		4	ТК3	
Topic 5 Arrays in Python	**12**	4	4		4	ТК4	ОК-3.3, ПК-11.3
Topic 6. String values in Python	**10**	2			8		ОК-3.3, ОК-3.У, ПК-11.3 ПК-11.У
Topic 7 Information security	**12**	2	4		8	ТК5	ОК-3.В, ОК-3.У, ПК-11.В ПК-11.У
Exam	**36**				36		**ОК-3.3, ОК-3.У, ПК-11.3 ПК-11.У**
Total for the semester	**108**	**18**	**18**		**72**	ОМ	

3.3. Contents of the discipline

Topic 1. Programming Technologies Alphabet

Methods of data representation in computing systems. Basic algorithmic structures and properties of an algorithm. The concept and properties of algorithms. The concepts of transla-tor, compiler, and interpreter. Arithmetic operations and mathematical functions of the Python language.

Topic 2. Linear Programs in Python

Alphabet, constants, variables. Expressions and operations. Data types. Assignment operator. Standard functions. Input and output operators. Connecting libraries. Implementation of linear programs.

Topic 3. Branching in Python

Branching Operators. Compound Conditions. Nested Branching.

Topic 4. Loops in Python.

The concept of a loop. Loop operators. Tabulating functions. Finding finite addition. Finding finite product. Finding the sum of an infinite series. Complex cyclic processes.

Topic 5. Arrays in Python.

Array Concept. Filling an Array. Printing an Array. Sorting an Array.

Topic 6. String Values in Python.

String Constants. String Operations.

Topic 7. Information Security.

Key Concepts. Information Threats. Malware. Viruses and Antivirus Software.

3.4. Thematic plan for practical classes

This type of work is not provided for in the curriculum.

3.5. Thematic plan of laboratory work

1. Linear programs
2. Branching operators.
3. Loop operators.
4. Arrays
5. Encryption.

3.6. Course project/coursework

This type of work is not provided for in the curriculum.

4. Assessment of learning outcomes

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

The scale of assessment of learning outcomes in the discipline:

Compe-tence code	Competence indicator code	Planned results of training in the discipline	The level of development of the competence indicator			
			High	Average	Below average	Low
			from 85 to 100	from 70 to 84	from 55 to 69	from 0 to 54
			Assessment scale			
			excellent	good	satisfactory	unsatis-factory
			credited			not credited
GPC-5 Able to use modern information technologies and software tools, including the management of large data sets and their intelligent analysis	GPC-5.1 Able to apply modern information technologies and software tools in solving professional tasks	to know:				
		definition of an algorithm and its properties, ways of writing an algorithm, and algorithmic structures (K)	it freely and fully describes the definition of an algorithm and its properties, the ways of writing an algorithm, and algorithmic structures.	it provides a comprehensive description of the algorithm definition and its properties, methods of algorithm recording, and algorithmic structures, and allows for inaccuracies.	it poorly describes the definition of an algorithm and its properties, the ways of writing an algorithm, algorithmic structures, and contains many errors	does not know the definition of an algorithm and its properties, the ways to write an algorithm, and algorithmic structures
		be able to:				
		develop and write algorithms in a programming language that contain basic algorithmic constructs (A)	freely develop and write algorithms in a programming language that contain basic algorithmic constructs	performs the development and recording of algorithms in a programming language that contain basic algorithmic constructs, and allows for inaccuracies	poorly performs the development and recording of algorithms in a programming language that contain basic algorithmic constructs, with many errors	does not know how to develop and write algorithms in a programming language that contain basic algorithmic constructs
		own:				
		skills in developing and	freely develops and writes	has sufficient knowledge	poor skills in developing	does not have the skills to

, in solving professional tasks.		writing algorithms in a programming language that contain basic algorithmic constructs (O)	algorithms in a programming language that contain basic algorithmic constructs	of developing and writing algorithms in a programming language that contain basic algorithmic constructs, and makes minor errors	and writing algorithms in a programming language that contain basic algorithmic constructs, and many errors	develop and write algorithms in a programming language that contain basic algorithmic constructs
GPC-6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC-6.2 Possesses the skills to apply digital technologies to solve professional tasks, taking into account the basic requirements of information security	to know:				
		goals, objectives, principles, and main directions for ensuring the information security of individuals and society (K)	It freely and fully describes the goals, objectives, principles, and main directions of ensuring information security for individuals, society, and the state.	it provides a comprehensive description of the goals, objectives, principles, and main directions of ensuring the information security of individuals, society, and the state, and allows for inaccuracies	it poorly describes the goals, objectives, principles, and main directions of ensuring information security for individuals, society, and the state, and contains many errors	does not know the definition of the goals, objectives, principles, and main directions of ensuring the information security of an individual, society, and the state

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.

5. Educational and informational support for the discipline

5.1. Educational and informational support

5.1.1. Basic literature

1. Severens, C. Introduction to Python Programming: A Tutorial / C. Severens. - 2nd ed., Rev. - Moscow: National Open University "INTUIT", 2016. - 231 p. - URL: https://e.lanbook.com/book/100703. - Text: electronic.

2. Khakhaev I.A. Practicum on algorithmization and programming in Python : a textbook / I. A. Khakhaev. - 2nd ed., ispr. - M. : National Open University "INTUIT", 2016. - 178 p. - URL: https://e.lanbook.com/book/100377 . - Text : electronic.

3. Galatenko, V. A. Fundamentals of Information Security: Textbook / V. A. Galatenko. - 2nd ed. - Moscow: National Open University "INTUIT", 2016. - 266 p. - URL: https://e.lanbook.com/book/100295. - ISBN 978-5-94774-821-5. - Text: electronic.

5.1.2. Additional literature

1. Zhukov, R. A. Python Programming Language: A Practical Guide: A Textbook / R. A. Zhukov. - Moscow: INFRA-M, 2022. - 216 p. - URL: https://ibooks.ru/bookshelf/378106. - ISBN 978-5-16-016971-2 (print). - ISBN 978-5-16-107207-3 (online). - Text: electronic.

2. Programming: Fundamentals of Algorithmization and Programming: Textbook / N. I. Parfilova, A. N. Pylkin, B. G. Trusov; edited by B. G. Trusov. - Moscow: Academy, 2012. - 240 p. - (Higher Professional Education. Bachelor's Degree). - ISBN 978-5-7695-9149-5. - Text: direct.

5.2. Information support

5.2.1. Electronic and Internet resources

№	Naming of electronic and Internet resources	Link
1	Electronic library system «Лань»	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	CyberLeninka	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	The 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 for Russian Legislation	http://garant.ru	http://garant.ru

5.2.3. Licensed and freely distributed software for the discipline

№	Name of the software	Description	Details of supporting documents
1	The operating system Microsoft Windows 10	The user's operating system	Agreement No. 133/2021 dated 12.10.2021, licensor - Soft Line Trade CJSC, type (species) of license - non-exclusive. right, license validity period - indefinitely
2	Microsoft Office 2019	Office Application Package	Agreement No. 133/2021 dated 12.10.2021, licensor - Soft Line Trade CJSC, type (species) of license - non-exclusive. right, license validity period - indefinitely
3	LMS Moodle	Software for effective online interaction between teachers and students	Free license, license type (species) - non-exclusive. right, license validity period - unlimited.
4	Browser Chrome	Information search system on the Internet	Free license, license type (species) - non-exclusive. right, license validity period - unlimited..

6. Logistical support of discipline

Name of the type of academic work	Name of the classroom, specialized laboratory	List of necessary equipment and technical training aids
Lectures	A classroom for conducting lecture-type classes	Specialized educational furniture, technical teaching aids used to present educational information to a large audience (multimedia projector, computer (laptop), screen), demonstration equipment, educational visual aids
Laboratory work	Software Engineering Educational Laboratory, Room B-608	Specialized laboratory equipment for the software engineering laboratory, specialized classroom furniture for 50 seats, 24 computers with Internet access and access to the Electronic Information System (EIOS), technical training aids (multimedia projector, multimedia board, all-in-one computer), and the necessary licensed software
	Computer lab, Room B-610	Specialized classroom furniture for 42 seats, 17 computers with Internet access and access

		to the Electronic Information System (EIOS), technical teaching aids (multimedia projector, projector screen, all-in-one computer), and the necessary licensed software
	Information Security Training Laboratory, Room B-615	Specialized laboratory equipment for the information security laboratory, specialized classroom furniture for 35 seats, 15 computers with Internet access and access to the Electronic Information System (EIOS), technical training aids (multimedia projector, multimedia board, all-in-one computer), and the necessary licensed software
	Computer lab, Room B-617	Specialized educational furniture for 24 seats, 21 computers with Internet access and access to the Electronic Information System (EIOS), and the necessary licensed software
	Computer lab, Room B-619	Specialized educational furniture for 24 seats, 21 computers with Internet access and access to the Electronic Information System (EIOS), and the necessary licensed software
	Computer lab, Room B-621	Specialized classroom furniture for 35 seats, 13 computers with Internet access and access to the Electronic Information System (EIOS), technical teaching aids (multimedia projector, projector screen, all-in-one computer), and the necessary licensed software
	Business Process Reengineering and Management Training Laboratory, Room B-623	Specialized laboratory equipment for the laboratory of reengineering and business process management, specialized classroom furniture for 34 seats, 13 computers with Internet access and access to the Electronic Information and Training System, technical training aids (multimedia projector, multimedia board, all-in-one computer), and the necessary licensed software
	Computer lab, Room B-600	Specialized classroom furniture for 30 seats, 30 computers, computers with Internet access and access to the Electronic Information System (EIOS), technical teaching aids (multimedia projector, laptop, screen), video cameras, and the necessary licensed software
Independent work	A computer lab with internet access and access to the Electronic Information System (EIEE) B-600	Specialized educational furniture for 30 seats, 30 computers, technical teaching aids (multimedia projector, computer (laptop), screen), video cameras, software
	The library's reading room	Specialized furniture, computer equipment with Internet access and access to the electronic information system (EIOS), a screen, a multimedia projector, and software

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

Individuals with disabilities and those with disabilities have access to all floors of the academic and laboratory buildings, and can study in classrooms and other spaces, taking into account their psychophysical development and health status. Barrier-free access to all classrooms is provided for students with disabilities and those with musculoskeletal disorders. Information on the special conditions created for students with disabilities and those with disabilities is available on the university website www//kgeu.ru. Technical assistance is available from an assistant, as well as sign language and audio-visual interpreters.

To adapt reference and educational material on the subject to the perception of persons with disabilities and persons with impaired hearing, the following conditions are provided:

- to improve orientation in the classroom, signals are used to announce the start and end of classes (the word "bell" is written on the board);
- the teacher attracts the attention of a hearing-impaired student with a gesture (a hand is placed on the shoulder, a gentle tap is made);
- when speaking to a student, the teacher looks at them, speaks clearly, in short sentences, and allows for lip reading.

Compensation for speech and intellectual development difficulties in hearing-impaired students is achieved through:

- the use of diagrams, charts, drawings, and computer presentations with hyperlinks that comment on individual image components;
- regular use of exercises to graphically highlight the essential features of objects and phenomena;
- providing the student with the opportunity to receive targeted advice via email as needed.

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

- the official website is adapted to accommodate the special needs of individuals with visual impairments, and large-print reference information on the class schedule is provided;
- the teaching staff and their interlocutor (if necessary), present during the class, introduce themselves to the student, and the person to whom the teaching staff is addressing is identified each time;
- the actions, gestures, and movements of the teaching staff are commented on briefly and clearly;
- printed information is provided in large font (at least 18 points) and is fully audible;
- the required level of lighting in the rooms is ensured;
- the opportunity to use computers during classes and the right to record explanations on a voice recorder (at the students' discretion) is provided.

The format for ongoing and midterm assessments for students with disabilities

is determined by the teaching staff in accordance with the curriculum. If necessary, students with disabilities and those with disabilities, taking into account their individual psychophysical characteristics, are given the opportunity to complete midterm assessments orally, in writing on paper, on a computer, through testing, etc., or are given additional time to prepare their responses.

8. Methodological recommendations for teachers on organizing educational work with students.

Methodological support for the student development process is one of the defining factors of high-quality education. By demonstrating high professionalism, erudition, a clear civic position, self-discipline, and a creative approach to solving professional problems, university teachers contribute to the development of a well-rounded individual throughout the educational process.

When implementing this course, the teacher may use the following educational methods:

- 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 (assignments, public opinion, pedagogical requirements, instructions, habituation, creating educational situations, training, exercises, 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, teachers must consider the following areas of educational activity:

- *Civic and patriotic education:*

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

-- developing in students an active civic position based on the traditional cultural, spiritual and moral values of Russian society, in order to increase their 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, and socially significant activities;

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

- *Spiritual and moral education:*

-- fostering a sense of dignity, honor, and honesty, conscientiousness, and respect for parents, teachers, and the elderly;

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

- - fostering solidarity and a sense of social responsibility toward people with disabilities, and overcoming psychological barriers to them;

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

Cultural and educational education:

- developing an aesthetic worldview;

- fostering respect for the cultural values of one's hometown, region, and country;

- enhancing students' cognitive activity.

Научно-образовательное воспитание:

- формирование у обучающихся научного мировоззрения;
- формирование умения получать знания;
- формирование навыков анализа и синтеза информации, в том числе в профессиональной области.

Changes and approvals for the new academic year

№	№ the section for making changes	Date of changes	The content of the changes	"Approved" Head of the Department of the discipline	"Approved" Chairman of the Academic Committee of the Institute (Faculty), which includes the graduating department
1	2	3	4	5	6
1					
2					
3					

Appendix to the course syllabus

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ASSESSMENT MATERIALS
for the discipline

B1.M.11.02 Algorithmization and programming

Kazan, 2026

The assessment materials for the discipline are designed to evaluate the learning outcomes in accordance with the indicators of competence achievement.

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

1. Technological map

Term 3

Наименование раздела	Формы и вид контроля	Рейтинговые показатели							
		I текущий контроль	Дополнительные баллы к ТК1	II текущий контроль	Дополнительные [illegible]	III текущий контроль	Дополнительные [illegible]	Итого	Промежуточная аттестация
Chapter 1. « Programming of Linear Structure Tasks in Python» **Chapter 2.** «Branching Algorithm Operator in Python»	**CC1**	**20**	**0-15**					**20-35**	**20-35**
Control work		10							
Laboratory work protection		5							
Individual tasks completion			0-15						
Chapter 4. «Implementing Cyclic Processes in Python" **Chapter 5.** «Implementing Cyclic Processes in Python»	**CC2**			**15**	**0-15**			**15-30**	**15-30**
Control work				10					
Laboratory work protection				5					
Individual tasks completion					0-15				
Chapter 7 «Information security»	**CC3**					**20**	**0-15**	**20-35**	**20-35**
Testing						15			
Protection of laboratory work						5			
Completion of individual assignments (essays)							0-15		
Intermediate certification (exam)	**EM 1**								**0-45**
В письменной форме по билетам									0-45

2. Оценочные материалы текущего контроля и промежуточной аттестации

Шкала оценки результатов обучения по дисциплине:

Compe-tence code	Competence indicator code	Planned results of training in the discipline	The level of development of the competence indicator			
			High	Average	Below average	Low
			from 85 to 100	from 70 to 84	from 55 to 69	from 0 to 54
			Assessment scale			
			excellent	good	satisfactory	unsatis-factory
			credited			not credited
GPC-5 Able to use modern information technologies and software tools, including the management of large data	GPC-5.1 Able to apply modern information technologies and software tools in solving professional tasks	to know:				
		definition of an algorithm and its properties, ways of writing an algorithm, and algorithmic structures (K)	it freely and fully describes the definition of an algorithm and its properties, the ways of writing an algorithm, and algorithmic structures.	it provides a comprehensive description of the algorithm definition and its properties, methods of algorithm recording, and algorithmic structures, and allows for inaccuracies.	it poorly describes the definition of an algorithm and its properties, the ways of writing an algorithm, algorithmic structures, and contains many errors	does not know the definition of an algorithm and its properties, the ways to write an algorithm, and algorithmic structures
		be able to:				
		develop and write algorithms in a programming language that contain basic algorithmic constructs (A)	freely develop and write algorithms in a programming language that contain basic algorithmic constructs	performs the development and recording of algorithms in a programming language that contain basic algorithmic constructs, and allows for inaccuracie	poorly performs the development and recording of algorithms in a programming language that contain basic algorithmic constructs, with many errors	does not know how to develop and write algorithms in a programming language that contain basic algorithmic constructs

				s		
		own:				
sets and their intelligent analysis, in solving professional tasks.		skills in developing and writing algorithms in a programming language that contain basic algorithmic constructs (O)	freely develops and writes algorithms in a programming language that contain basic algorithmic constructs	has sufficient knowledge of developing and writing algorithms in a programming language that contain basic algorithmic constructs, and makes minor errors	poor skills in developing and writing algorithms in a programming language that contain basic algorithmic constructs, and many errors	does not have the skills to develop and write algorithms in a programming language that contain basic algorithmic constructs
GPC -6 Able to understand the principles of modern information technologies and use them to solve professional tasks	GPC -6.2 Possesses the skills to apply digital technologies to solve professional tasks, taking into account the basic requirements of information security	to know:				
		goals, objectives, principles, and main directions for ensuring the information security of individuals and society (K)	It freely and fully describes the goals, objectives, principles, and main directions of ensuring information security for individuals, society, and the state.	it provides a comprehensive description of the goals, objectives, principles, and main directions of ensuring the information security of individuals, society, and the state, and allows for inaccuracies	it poorly describes the goals, objectives, principles, and main directions of ensuring information security for individuals, society, and the state, and contains many errors	does not know the definition of the goals, objectives, principles, and main directions of ensuring the information security of an individual, society, and the state

An **«excellent»** grade is awarded for completing the semester's assignments without errors or shortcomings; providing complete and meaningful answers to the exam questions (theoretical and practical assignments);

A **«good»** grade is awarded for completing the semester's assignments with minimal errors and shortcomings; providing comprehensive and meaningful answers to the exam questions (theoretical or practical assignments);

A **«satisfactory»** grade is given for completing term papers with a large number of errors and shortcomings.

A **«failing»** grade is given for poor and incomplete performance of semester tests and a lack of minimal programming skills.

3. List of evaluation tools

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

Name of the evaluation tool	Brief description of the evaluation tool	Description of the evaluation tool
Control work (CW)	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 control tasks by options
Laboratory work report (LWR)	Performing laboratory work, processing test, measurement, and experiment results. Drawing up a report, defending the results of laboratory work based on the report	List of tasks and questions for the laboratory work defense, list of requirements for the report
Multi-level tasks and assignments (MLT)	There are different types of tasks and assignments: a) tasks of the reproductive level, which allow to evaluate and diagnose the knowledge of factual material (basic concepts, algorithms, and facts) and the ability to correctly use special terms and concepts, as well as to recognize objects of study within a specific discipline; b) tasks of the reconstructive level, which allow to evaluate and diagnose the ability to synthesize, analyze, and generalize factual and theoretical material, formulate specific conclusions, and establish cause-and-effect relationships; c) tasks of the creative level, which allow to evaluate and diagnose the ability to integrate knowledge from different fields, argue one's own point of view	A set of multi-level tasks and assignments
Test (T)	A system of standardized tasks that allows you to automate the process of measuring a student's knowledge and skills	A set of test tasks
Summary (Smr)	A product of a student's independent work, which is a written summary of the results of a theoretical analysis of a specific scientific (educational) topic	Essay topics
Exam	The assessment materials used in the exam consist of exam questions and practical tasks to test practical	Set of exam questions

	skills.	

4. List of control tasks or other materials necessary for assessing the knowledge, skills, and abilities that characterize the stages of competency development during the course of study

Example of a task

For the current control CC1:

Verifiable competence: GPC -5, GPC -5.1

Sample problems for test No. 1

1. Given 2 positive numbers. Find the arithmetic mean and geometric mean.
2. Given an isosceles triangle. Find the area of the triangle and one side.
3. Given the circumference of a circle. Find the area and radius of the circle.
4. Determine the time it takes for a stone to fall to the ground from a height h/
5. Given a triangle with sides A, B, and C. Determine whether it is isosceles, equilateral, or scalene.
6. The numbers A, B, C, D. Determine which of them is greater.
7. A, B, and C are the coefficients of the quadratic equation. Find the roots.
8. Three different numbers are given. Determine the maximum and minimum values of these three numbers.
9. Create a program that displays the name of the day of the week depending on the serial number.
10. Create a program for finding the product of the two smallest of three different numbers.

Laboratory work report

The report is drawn up by each student individually and must contain: the number and name of the work, the purpose of the work, the task condition, the program text, the program execution result.

For each laboratory work, there is a list of questions for the laboratory work defense.

Example: Security questions

1. What are linear programs.
2. The form of the input statement
3. The form of the output statement
4. Explain how the branching algorithmic structure works.
5. What are the forms of the If statement? 6. List the logical functions.

Multi-level tasks and assignments

1. Enter an array A(N) consisting of positive and negative numbers. Create two arrays from it - one of negative numbers, the other of positive numbers. Print all three arrays.

2. Enter an array A(N) consisting of positive and negative numbers. Create an array from it, where all negative elements are replaced with zero. Print two arrays.

3. Enter an array A(N) consisting of positive and negative numbers. Create an array from it, where all positive numbers are replaced with 1 and all negative numbers are replaced with -1. Print the original and transformed arrays, as well as information about the number of positive and negative numbers.

4. Enter an array A(N) consisting of positive and negative ones and zeros. Print information about the number of positive and negative ones, zeros, and their indices.

5. Enter the array A(N) and three numbers m, n, k. Convert the original array so that the elements $A(I) \leq m$ are replaced with m, $m \leq A(I) \leq n$ are replaced with n, $n \leq A(I) \leq k$ are replaced with k, and $A(I) \in k$ are replaced with 2k.

6. Enter the array A(N). Multiply the first five elements by 2, the second five elements by 3, and assign zero values to the remaining elements. Print the original and transformed arrays.

7. Enter the array A(N). Find the sum and product of the array elements.

8. Enter the array A(N). Find the sum of the first K elements of the array. For the remaining elements, find the product.

9. Enter the array A(N). For elements from M to N, find the product. For the remaining elements, find the sum.

10. Enter the array A(N). Find the sum and product of the last K elements.

For the current control CC2:

Verifiable competence: GPC -5, GPC -5.1

Sample tasks for Test No. 2

1. Write a program to calculate the sum of even numbers.

2. Write a program to calculate the product of odd numbers.

3. Calculate the sum of the squares of all two-digit numbers that are divisible by three.

4. Enter the array A(N). Print the elements of the array that are equal to an arbitrary number m.

5. Enter the array A(N). Increase each element of the array by an arbitrary number k. Print the resulting array.

6. Enter the array A(N). Cube each element of the array A(N). Print the resulting array

7. Enter the array A(N). Increase each element by k times. Print the resulting array.

8. Enter the array A(N). Set the number L. Print the number of array elements equal to L. If there are no such elements, print a message indicating this.

9. Enter the array A(N). Set the number L. Replace all array elements greater than L with L. Print the original and transformed arrays.

10. Enter the array A(N). Double the elements with indices from 0 to N/2. Leave the remaining elements unchanged. Print the original and transformed arrays.

Laboratory work report

The report is drawn up by each student individually and must contain: the number and name of the work, the purpose of the work, the condition of the task, the text of the program, the result of the program execution. For each laboratory work, there is a list of questions for the defense of the laboratory work.

The report is completed by each student individually and must contain: the number and title of the work, the purpose of the work, the task condition, the program text, and the program execution result.

Each laboratory work includes a list of questions for the laboratory work defense.

Control questions

1. What is a loop? What are the advantages of using loop statements in a program?
2. What are the differences between pre-condition and post-condition loops?
3. Give a verbal algorithm for tabulating a function.
4. List the steps involved in solving problems involving multiplication.
5. What is an array?
6. What is a one-dimensional data array?
7. Give some examples of one-dimensional data arrays.

Multi-level tasks and assignments

1. Fill the array A(N) with the members of the natural series that are multiples of three (3, 6, 9...) until their product becomes greater than an arbitrary number M. Find the sum of the array elements and their number.
2. Set the array A(N), N=K+M. The array elements with indices from 0 to K are the even members of the natural series (2, 4, 6...), while the remaining elements are odd. Find the sum and product of the array elements.
3. Set the array A(N), N=K+M. The elements of the array with index from 0 to K are the members of the natural series that are multiples of 2, and the remaining elements are multiples of 5. Find the sum and product of the array elements, and the quotient of dividing the sum by the product.
4. Задать массив A(N), элементы которого являются членами ряда $A(I)=I^2$ не большими наперед заданного числа $M \geq 1000$. Найти среднее значение элементов массива.
5. Set the array A(N) of non-zero members of the series A(I)=I3 not greater than a predetermined number $M \geq 2000$. Find the product of the array elements and their sum.
6. Set the array A(N) of members of the series A(I)=1/I, where I=1, 2... The number of array elements is limited by the condition $A(I) \leq K$, where K<<1. Find the sum of the array elements, their product, and the average value.
7. Define an array A(N) of series members A(I)= . Limit the number of array elements by the condition $A(I) \leq K$, where K>>1. Find the sum, product, and average value of the array elements.
8. Set the array A(N) of the first twenty members of the series A(I)= . Find the

sum of the first ten elements of the array and the product of the second ten elements of the array.

9. Enter the array A(N) of the members of the series A(I)= . The number of elements is limited by the condition A(I)≤M, where M>>1. Find the sum of the even members of the series and the product of the odd members of the series.

10. Enter the array A(N) of the members of the series A(I)= . The number of series members is limited by the condition A(I)≤M, where M>>1. Find the sum of the series members that are divisible by two and the product of the series members that are divisible by three.

For the current control CC3:

Verifiable competence: GPC -6, GPC -6.2

Laboratory work report

The report is completed by each student individually and must contain: the number and title of the work, the purpose of the work, the condition of the task, the result of the task. Each laboratory work contains a list of questions for the defense of the laboratory work.

Control questions

1. Explain the principle of information protection using the Caesar cipher.
2. Explain the content of the IF formulas.
3. List the advantages and disadvantages of the Caesar cipher.
4. Think about other methods of information protection.

Tests

By affiliation, information resources are divided into	government, commercial, and personal
	public, non-public, and information about citizens
	information of legal entities and individuals
	official, civil and commercial
Confidential information includes documents containing	state secret
	legislative acts
	"know-how"
	information about the country's gold reserves
Confidential information is	information that constitutes a state secret
	information about the health status of senior officials
	documented information that is restricted by Russian law
	data on the state of crime in the country данные о состоянии преступности в стране
Система защиты государственных секретов определяется Законом	"On Information, Informatization, and Information Protection"
	"On the Federal Security Service"
	"On State Secrets"

	"On Security"
According to the method of infection, viruses are	dangerous
	file
	residential
	bootable
	file-bootable
	non-resident
Viruses that change the environment include	worms
	mutants
	parasites
	polymorphic
	satellites
What is not an information infection?	Trojan horse
	data falsification
	worms
	viruses
	logical bomb
The most dangerous sources of internal threats are	Incompetent managers
	are hackers
	offended employees
	curious administrators
The main reason for the existence of numerous information security threats is	miscalculations in the administration of information systems actions by malicious users and hackers
	the need for constant modification of information systems
	curiosity and the machinations of ill-wishers
	the complexity of modern information systems
The threat is not considered accidental	staff error;
	force majeure;
	error of automated systems;
	bookmark programs

Topics of the essays:

1. Basic concepts of information security.
2. Information protection system and types of its support.
3. Economic information as a commodity and an object of security.
4. Information related to confidential information.
5. Information threats and their types.
6. Classification of intentional threats.
7. Actions and events that violate information security (disclosure, leakage, unauthorized access)
8. Disclosure of information
9. Information leakage.
10 Unauthorized access.
11. Methods of threats impact on information objects.
12. Internal and external sources of potential threats.
13 Classification of security threats.
14. Malicious programs.

15. The main classes of viruses and methods of infection, antivirus programs.
16 Computer crimes and their classification.
17. Interception of information.
18. Unauthorized connection.
19. Unauthorized modification
20. Unauthorized blocking.
21. Unauthorized destruction.
22. Methods of interception.
23. Methods of unauthorized access.
24. Methods of manipulation.
25. Subjects of computer crimes.
26. Prerequisites of computer crimes.
27. State regulation of information security.
28. Methodological principles of information security.
29. Organizational principles of information security.
30. Implementation principles of information security.
31. Basic means of information protection. (physical, hardware, hardware, etc.).
32. Electronic digital signature.

For the intermediate certification of EM1:

Exam questions:

1. The concept of an algorithm: definition, properties, and ways of representing algorithms.
2. Data types.
3. Variables. Variable names
4. Operations. Order of operation execution.
5. Input operator.
6. Output operator.
7. Branching operator.
8. Loop operators.
9. The problem of tabulating a function: formulation, solution.
10. The problem of calculating the sum of elements of a finite series: formulation, solution.Задача вычисления произведения элементов конечного ряда: постановка, решение.
11. Calculation of the sum of an infinitely decreasing series with a given accuracy: formulation, solution. Iterative cycles.
12. Complex cyclic processes. Nested cycles.
13. The concept of an array. The size and dimension of an array.
14. Input of one-dimensional arrays.
15. Output of one-dimensional arrays.
16. Basic concepts of information security.
17. Information protection system and types of information security.
18. Information related to confidential information.
19. Information threats and their types.
20. Classification of intentional threats.

21. Actions and events that violate information security (disclosure, leakage, unauthorized access)

22. Methods of threat impact on information objects.

23. Internal and external sources of potential threats.

24. Classification of security threats.

25. Malicious programs.

26. Main classes of viruses and methods of infection, antivirus programs.

Typical exam problems:

1. Output the number of elements of the array A(N) that are greater than m.

2. Increase each element of the array A(N) by m and output the array.

3. Replace each element of A(N) with its cube and output the array.

4. Replace each element of A(N) with 0 and output the array.

5. Replace elements of the array A(N) that are greater than 10 with 8 and output the new array.

6. Replace the elements of the array A(N) greater than m with the number k and output the array.

7. Replace the elements of the array greater than X with their squares, otherwise reduce them by half and output the array.

8. Replace each element of A(N) with its square and output the array.

9. How many even elements are there, and how many odd elements are there in the array A(N)?

10. Find the total number of non-zero elements in the array A(N).

11. Find the sum of the elements in the array A(N) that are multiples of 3.

12. Find the sum of the even elements and the product of the odd elements in the array A(N).

13. Find the product of the elements in the array A(N) that are multiples of m.

14. Find the sum of the elements in the array A(N) that are multiples of m.

15. Find the sum of the positive elements of the array and the product of the negative elements of the array.

16. Given an array A(N), find the sum and product of the elements of the array.

17. Replace each element of A(N) with its square and output the array.

18. Output the number of elements of A(N) that are less than R.

19. Output the number of elements of A(N) that are equal to T.

20. Reduce each element of A(N) by k and output the array.

21. Find the sum of the positive elements in the array A(N).

22. Find the total number of zero elements in the array A(N).

23. Replace the elements of the array A(N) that are less than K with the number P and output the array.