Ministry of Science and Higher Education of the Russian Federation

Federal State Budgetary Educational Institution of Higher Education

Perm National Research Polytechnic University

APPROVED BY

Pro-rector for Academic Affairs

_____ N.V. Lobov

_____ 03 _____ 20 21

ACADEMIC COURSE WORKING PROGRAM

Academic course: _____ Computer science _____

(Name)

Form of education: _____ Full-time studies _____

(Full-time /full-time – correspondence/correspondence)

Level of higher education: _____ Bachelor's program _____

(Bachelor's program/specialist program/
Master's program)

Workload in hours (in credits): _____ 180 (5) _____

(Hours (CU))

Training program (degree): _____ 21.03.01 Oil and Gas Engineering _____

(Code and denomination of degree)

Direction: _____ Oil and Gas Engineering _____

(Title of curriculum)

Perm 2021

1. GENERAL PROVISIONS

1.1. GOALS AND OBJECTIVES OF THE COURSE

Mastering the necessary and sufficient level of research competence to solve problems in the field of professional activity using modern information technologies and applied hardware and software.

The objectives of the discipline are:

1. Develop the skills to search, extract, systematize, analyze and select information necessary for solving problems, organize it, transform it, and save it.

2. Develop computer skills for solving simple engineering calculations.

3. Form of ownership methods of storage, transmission, processing and presentation of information in the computer.

1.2. STUDIED OBJECTS OF THE COURSE

Hardware of computer equipment; software computer technology; interaction between hardware and software; human interaction with hardware and software.

1.3. STARTING CONDITIONS

Unstipulated

2. PLANNED RESULTS OF THE COURSE TRAINING

Compe-tence	Indicator's Index	Planned Results of the Course Training (to know, to know how, to master)	Indicator of Attaining Competence which the planned results of training are correlated with	Means of Assessment
1	2	3	4	5
GPC-5	IA-1$_{gpc-5}$	**To know** structure and methods of digital reporting of oil and gas properties and composition; basic rules for registration and preparation of business documentation based on the basic provisions on measurements, methods, means of ensuring their unity and ways to achieve the required accuracy, comprehensive and quantitative assessment of the quality of oil and gas production facilities; basic	**Knows** content and properties of oil and gas, general provisions of metrology, qualimetry, standardization and certification of oil production.	Exam

1	2	3	4	5
		rules for the registration and preparation of business documentation based on the main provisions for establishing norms, rules and characteristics and confirming the compliance of objects with the requirements of technical regulations, standards, codes of rules or terms of contracts for oil and gas production		
GPC-5	IA-2$_{gpc-5}$	**To be able to** use software packages on your computer to solve simple engineering calculations; use mass media and multimedia technologies to study, analyze and present research results; independently search, extract, systematize, analyze and select information necessary for solving problems, organize, transform, save and transmit it	**Is able to** use computer with aim to make simple engineering calculation; use appropriately software packages; use general technologies of exploration and prospect for oil as well as organization of oil production in Russia and abroad, standards and specification, sources of information, mass media and multimedia technologies; acquire knowledge by the application of modern educational and information technologies; orient in data flows selecting principal and necessary information; consciously assimilate information, independently find, derive, systematize, analyze and select necessary information aimed at problems solution, organize, transform, store and pass it; critically reconsider cumulative information, form personal opinion, convert information into knowledge, apply information in problems solution using different ways of text processing.	Laboratory lesson report
GPC-5	IA-2$_{gpc-5}$	**To master** methods for protecting the storage and submission of information using modern information technologies and hardware and software; methods of	**Masters** methods of risk assessment and management of quality performance of manufacturing operations; methods of collection and processing of obtained	Laboratory lesson report

1	2	3	4	5
		collecting and processing the received information for risk assessment and quality management of technological operations	information using modern information technologies and applied hardware and software, methods of information security, storage and submission.	

3. FULL TIME AND FORMS OF ACADEMIC WORK

Form of academic work	Hours in all	Distribution in hours according to semesters		
		Number of semester		
		1		
1. Holding classes (including results monitoring) in the form: 1.1.Contact classwork, including:	54	54		
– lectures (L)	18	18		
– laboratory work (LW)	32	32		
– practice, seminars and/or other seminar-type work (PW)				
– control of self-work (CSW)	4	4		
– test				
1.2. Students' self-work (SSW)	90	90		
2. Intermediate attestation				
Exam	36	36		
Grading test				
Test (Credit)				
Course Project (CP)				
Course Work (CW)				
Workload in hours	**180**	**180**		

4. COURSE OUTLINE

Name of the units with the course outline	Full time of classroom activity in hours according to the forms			Full time of extracurricular work in hours according to the forms
	L	LW	PW	SSW
1	2	3	4	5
1 semester				
Module 1. Information processes and their software	6	14		32
Topic 1. Basic concepts of information theory. Goals and objectives of computer science. The concept of information. Description of the processes of collecting, transmitting, processing, and accumulating information. Information properties. Data. Data operation. Encoding of text, numeric, and graphic data. Basic structures: linear, tabular, and hierarchical. Number system. Units of representation, measurement, and data storage.				

1	2	3	4	5
Topic 2. Technical means of implementing information processes. A brief history of computer development. Generation of computers. Computer classifications: by purpose, level of specialization, size, compatibility, etc. Basic configuration of a modern personal computer.				
Topic 3. Software for implementing information processes. Software and its levels. Software classification. Directions of development and evolution of software tools. The concept of the operating system (OS). OS classification. OS functions. Files and file structure.				
Topic 4. Word processor. Working in a word processor. Display mode. Document creation: text formatting, spell checking, thesaurus, AutoFormat, and AutoCorrect. Insert figures, formulas, and tables.				
Topic 5. Spreadsheets. The creation of spreadsheets. Appointment. Basic concept. Data types, input, editing, and formatting. Simple calculations, using standard functions. Create a chart.				
Topic 6. The creation of presentations. Creating presentations. Use templates. Create slides: insert text, drawings, formulas, tables, audio and video information.				
Module 2. Algorithms	8	16		42
Topic 7. Algorithms and algorithmization. Visualization of algorithms. The concept of an algorithm. Forms of representation of algorithms. Graphical representation of algorithms. Linear, branched, and cyclic algorithms. Nested and parallel algorithms. Building an algorithm from basic structures. Step-by-step detailing as a method for designing algorithms.				
Topic 8. Software for implementing algorithms. Computer language. Algorithmization and programming. Syntax and semantics. Translation, interpretation, and compilation of programs. Program testing. Programming algorithms.				
Topic 9. The packages of applied programs. Mathematical and graphical application software packages				
Module 3. Storage, networking and security	4	2		16
Topic 10. Data base. Databases and knowledge bases. Purpose of the database. Basic concepts of relational databases: fields and records, field properties, and data types. Database management systems. Database design and processing.				
Topic 11. Telecommunications. Local and global computer networks. Local and global computer networks. Network protocols. Network services. Basics of working on the Internet. Basic Internet Services.				

1	2	3	4	5
Topic 12. Methods and means of information protection. The concept of computer security and protection of information constituting a state secret. Computer viruses: classification, methods and means of antivirus protection. Protection of information on the Internet. The concept of encryption. The principle of sufficiency of protection. Electronic signature.				
Total with regard to semester	18	32		90
Total with regard to the course	18	32		90

Topics of exemplary practical work

Sl.№	Topic of practical (seminar) work
	Unstipulated

Topics of exemplary laboratory practice

Sl.№	Topic of laboratory work
1	Encoding of numeric data. Converting numbers from one number system to another. Binary arithmetic
2	Files and file storage system. Organization of work with the objects in the file structure
3	Archiving of documents
4	Local and global computer networks. Data processing using global networks
5	Create and edit documents in Microsoft Word and Google Docs
6	Creating spreadsheets
7	Processing data in Microsoft Excel and Google Spreadsheets
8	Processing spreadsheet data on Android and iOS mobile platforms
9	Creating presentations
10	Linear algorithm
11	Branched algorithms
12	Cyclic algorithms
13	Application package
14	Data processing by means of databases

5. ORGANIZATIONAL AND PEDAGOGICAL CONDITIONS

5.1. EDUCATIONAL TECHNOLOGIES USED FOR COMPETENCES FORMATION

Holding lectures in the discipline is based on the active method of training in the process of which students are not passive but active participants of the lesson answering questions of the teacher. Teacher's questions are aimed at activating the process of learning material as well as at the development of logical thinking. The questions stimulating associative thinking and connecting new material with the previous one are identified by the teacher in advance.

Laboratory classes are based on an interactive learning method in which students communicate not only with the teacher but also with each other. At the same time, students ' activity in the learning process dominates. The teacher's place in interactive classes is reduced to orienting students ' activities to achievement of the goals of studies.

Interactive lectures, group discussions, role-playing games, training sessions, and analysis of situations and simulation models are used in academic studies.

5.2. STUDENTS' MANUAL FOR THE COURSE STUDY

Learning the course students are recommended to fulfill the following positions:

1. Learning of the discipline should be done systematically.

2. After learning one of the course unit with the help of the text-book or lecture notes it is recommended to reproduce in memory the basic terms, definitions, notions of the unit.

3. Special attention should be paid to the reports on laboratory works and individual complex tasks for self-work.

4. The topic of questions studied individually is given by the teacher at the lectures. Also the teacher refers to the literary resources (first of all, to the newly published in periodicals) in order the students understand the problems touched on the lectures in detail.

6. LIST OF TEACHING MATERIALS
AND INFORMATION SUPPLY FOR STUDENTS' SELF
WORK IN THE DISCIPLINE

6.1. PAPER-BASED COURSEWARE

Sl.№	Bibliographic entry (author, title, mode of publication, place, publishing house, year of publication, number of pages)	Number of copies in the library
1	2	3
	1. Basic literature	
1	Esteras S. R. Infotech. English for Computer Users : Student's Book. 4th ed Cambridge : Cambridge Univ. Press, 2008. 168 p.	49
2	Esteras S. R. Infotech. English for Computer Users : Student's Book. 4th ed Cambridge : Cambridge Univ. Press, 2014. 168 p.	9
3	Khabibrahmanova F. R. Development of Computers: from Transistors to Quantum Machines. Perm: PRNPU, 2018. 160 p.	5
4	Balakhonov A.S., Lykov A.N. Computers and information technologies. Perm: PNRPU, 2018. 140 p.	5
	2. Additional literature	
	2.1. Educational and scientific literature	
1	Rajaraman A. Computer Graphics for Engineers / A. Rajaraman. – Oxford: Alpha Science Intern. Ltd, 2009.	1

1	2	3
2	Patil P.B. Numerical Computational Methods / P.B. Patil, U. P. Verma. – Oxford: Alpha Science Intern. Ltd, 2006.	1
3	An Attribute Grammar for the Semantic Analysis of Ada / J. Uhl [et al.]. – Berlin [et al.]: Springer-Verlag, 1982.	1
4	English for Computer Science Students : textbook / T. V. Smirnova;. M.: Flinta, Science, 2004.	19
5	Computers and Informatics in Developing Countries / World Acad. of Sciences TriesteThird,Italy. – London: Butterworths, 1989.	1
6	Terms of contemporary informatics: programming, computer science, Internet / E. Yu. Vaulina, V. N. Rychkov. M.: Eksmo, 2004. 637 p.	9
7	A Dictionary of Computing : over 6300 entries / 5th ed Oxford : Oxford University Press, 2004. 597 p.	1
2.2. Standardized and Technical literature		
	Unstipulated	
3. Students' manual in mastering discipline		
	Unstipulated	
4. Teaching and learning materials for students' self work		
	Unstipulated	

6.2. ELECTRONIC COURSEWARE

Kind of literature	Name of training tool	Reference to information resource	Accessibility of EBN (Internet/local net; authorized/free access)
Basic literature	Informatics. Laboratory workshop on English language. Teaching manual / V. I. Lebedev, I. V. Lebedeva. – Stavropol: Publisher of NCFU, 2018. – 153 p.	URL: http://www.ipr-bookshop.ru/ 83195.html (date of request: 30.11.2020)	authorized access
Basic literature	Lebedev V. I. Informatics: course of lectures in English. – Stavropol: Publisher NCSU, 2015. – 102 p	URL: http://www.ipr-bookshop.ru/ 63090.html (date of request: 30.11.2020)	authorized access
Additional literature	Gvozdeva E. A. Computer science : educational and methodical manual / E. A. Gvozdeva. – Moscow : NRNU MEPhI, 2011. – 52 c. – ISBN 978-5-7262-1601-0.	URL: https://e.lan-book.com/book/ 75995 (date of request: 29.11.2020)	authorized access
Additional literature	Pushkina E.N. English for radio physicists and computer science learners / E.N. Pushkina. – Nizhnij Novgorod : Lobachevsky UNN, 2020. – 131 c.	URL: https://e.lan-book.com/book/ 144628 (date of request: 30.11.2020)	authorized access

6.3. LICENSE AND FREE DISTRIBUTED SOFTWARE USED IN THE COURSE EDUCATIONAL PROCESS

Type of Software	Software branding
Operating system	Windows 10, lic. 66232645
Operating system	Windows 7, lic.MS Imagine
Office software	Adobe Acrobat 9.0 Pro Edu, lic. 21134490
Office software	Microsoft Office Professional 2007. lic. 42661567
General purpose application software	ПО Dr.Web Desktop Security Suite , 2000 lic, PNIPU 2017
General purpose application software	Mathcad 14 University Classroom, lic. SE14RYMMEV0002-FLEX
General purpose application software	WinRAR, lic. # 879261.1493674
Image processing software	CorelDRAW Graphics Suite X4, lic. LCCDGSX4MULAB
General purpose application software	Total Commander 7.xx, lic. 110000
Management systems for projects, research, development, design, modeling and implementation	Autodesk AutoCAD 2019 Education Multi-seat Stand-alone

6.4. MODERN PROFESSIONAL DATABASES AND INQUIRY SYSTEMS USED IN THE COURSE EDUCATIONAL PROCESS

Branding	Reference to information resource
Elsevier "Freedom Collection" database	https://www.elsevier.com/
Scopus database	https://www.scopus.com/
Springer Nature e-books database	http:/link.springer.com/ http://jwww.springerprotocols.com/ http://materials.springer.com/ http://zbmath.org/ http://npg.com/
Web of Science database	http://www.webofscience.com/
Scientific electronic library database (eLIBRARY.RU)	https://elibrary.ru/
Scientific library of Perm national research Polytechnic University	http://lib.pstu.ru/
LAN electronic library system	https://e.lanbook.com/
Iprbooks electronic library system	http://www.iprbookshop.ru/
Virtual reading room of the Russian state library	https;//dvs.rsl.ru/
Electronic library of dissertations of the Russian state library	http://www.diss.rsl.ru/

7. LOGISTICS OF THE COURSE EDUCATIONAL PROCESS

Type of classes	Name of the necessary basic equipment	Number of units
Laboratory work	Computers included (system unit, monitor, keyboard, mouse)	15
Lecture	Interactive whiteboard	1
Lecture	Multimedia complex consisting of: multimedia projector, interactive whiteboard, acoustic system	1

8. FUND OF THE COURSE EVALUATING TOOLS

Described in a separate document

Ministry of Science and Higher Education of the Russian Federation

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FUND OF ESTIMATING TOOLS

**For students' midterm assessment in the discipline
Computer science**
Supplement to the Academic Course Working Program

Training program	21.03.01 Oil and Gas Engineering
Direction (specialization) of educational program	Oil and Gas Engineering
Graduate qualification	Bachelor's degree
Graduate academic chair	Oil and Gas Technology
Form of study	Full-time studies

Year (-s): 1   **Semester (-s):** 1

Workload
in credits 5 CU
in hours 180 h

The form of midterm assessment:
Exam 1 semester

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Fund of estimating tools for midterm assessment of students' learning the subject "Computer science" is the part (supplement) to the academic course working program. Fund of estimating tools for midterm assessment of students' learning the discipline has been developed in accordance with the general part of the fund of estimating tools for midterm assessment of the basic educational program which determines the system of the midterm assessment results and criteria of putting marks. Fund of estimating tools for midterm assessment of students' learning the subject determines the forms and procedures of monitoring results and midterm assessment of the subject leaning by the students.

1. LIST OF CONTROLLED RESULTS OF STUDYING DISCIPLINE, OBJECTS OF ASSESSMENT AND FORMS OF CONTROL

According to the Academic Course Working Program mastering course content is planned during one semester (the first semester of curriculum) and is divided into three educational modules. Classroom activities, lectures and laboratory work as well as students' self-work are provided for every module. In the frames of mastering course content such competences as *to know, to be able, to master* pointed out in the ACWP are formed. These competencies act as the controlled results of learning the discipline "Computer science" (Table 1.1).

Monitoring of the acquired knowledge, abilities and skills is made in the frames of continuous assessment, progress check and formative assessment in the process of studying theoretical material, reports on laboratory works and during examination. Types of control is given in Table 1.1

Table 1.1 – List of controlled results of learning the discipline

Controlled results of learning the discipline (KAS)	Type of control					
	Continuous assessment		Progress check		Formative assessment	
	D	AC	LWR/ PWR	T/CW		Exam
1	2	3	4	5	6	7
Acquired knowledge						
K.1 Structure and methods of digital reporting	D			CW		TQ
K.2 Basic rules for registration and preparation of business documentation	D			CW		TQ
Acquired abilities						
A.1 Use software packages on your computer to solve simple engineering calculations			LWR	CW		PT
A.2 Use mass media and multimedia technologies to study, analyze and present research results			LWR	CW		PT
A.3 Independently search, extract, systematize, analyze and select information necessary for solving problems, organize, transform, save and transmit it			LWR	CW		PT

1	2	3	4	5	6	7
Mastered skills						
S.1 Methods for protecting the storage and submission of information using modern information technologies and hardware and software			LWR	CW		CT
S.2 Methods of collecting and processing the received information for risk assessment and quality management of technological operations			LWR	CW		CT

D – topic discussion; AC –colloquium (discussion of theoretical material, academic conference); CT – case-task (individual task); LWR – report on laboratory work; PWR – report on practical work; T/CW – progress check (control work); TQ – theoretical question; PT – practical task; CT – complex task of grading test.

Final assessment of the learned discipline results is the midterm assessment which is made in the form of an exam taking into consideration the results of the running and progress check.

2. TYPES OF CONTROL, STANDARD CONTROL TASKS AND SCALES OF LEARNING RESULTS ASSESSMENT

Continuous assessment of the academic performance is aimed at maximum effectiveness of the educational process, at monitoring students' specified competencies formation process, an increase of learning motivation and provides the assessment of mastering the discipline. In accordance with the regulations concerning the continuous assessment of the academic performance and midterm assessment of students taught by the educational programs of Higher education – programs of the Bachelor's Course, Specialists' and Master's Course the next types of students' academic performance continuous assessment and its periodicity is stipulated in PNRPU:

– acceptance test, check of the student's original preparedness and his correspondence with the demands for the given discipline learning;

– continuous assessment of mastering the material (the level of mastering the component "to know" defined by the competence) at every group studies and monitoring of lectures attendance;

– interim and progress check of students' mastering the components "to know" and "to be able" of the defined competences by computer-based or written testing, control discussions, control works (individual home tasks), reports on laboratory works, reviews, essays, etc.

Discipline progress check is conducted on the next week after learning the discipline module, while the interim control is made at every monitoring during the discipline module study;

– interim assessment, summarizing of the current students' performance at least once a semester in all disciplines for every training program (specialty), course, group;

– retained knowledge control.

2.1. CONTINUOUS ASSESSMENT OF EDUCATION

Continuous assessment of learning is made in the form of discussion or selective recitation on every topic. According to the four-point system the results of assessment are put into the teachers' note-book and are considered in the form of an integral mark in the process of the midterm assessment.

2.2. PROGRESS CHECK

For the complex assessment of the acquired knowledge, abilities and skills (Table 1.1) it is made the progress check in the form of laboratory work presentation and midterm control works (after learning every discipline module).

2.2.1. Presentation of laboratory work

It is planned 16 laboratory works all in all. Standard topics of laboratory work are given in ACWP.

Presentation of laboratory work is made by the student individually or by the group of students. Standard scale and criteria of assessment are given in the general part of FET of the educational program.

2.2.2. Midterm control work

According to ACWP 3 midterm control works (CW) is planned to be realized after learning the educational modules of the discipline by the students.

The first CW is realized with respect to the module 1 "Information processes and their software", the second CW – with respect to the module 2 "Algorithms", the third CW – with respect to the module 3 "Storage, networking and security".

Standard tasks of the first CW:

1. Calculate and check $134_{10} + 17_8 \rightarrow ?_2$

2. Calculate and check $235_{10} + 1001_2 \rightarrow ?_8$

3. Select or create a folder with a size of no more than 10MB. Archive the folder at the specified address.

4. Select or create a folder with a size in the range of 10–15Mb. Split the archive file into 3 parts.

5. Select or create a folder with a maximum size of 10 MB. Close access to folders and files in the archive and encrypt all files and folders during the archiving process.

6. Play suggested text using formatting automation techniques.

7. Perform calculations in a word processor for a variant of the task.

8. Select the required chart and draw a graph of the proposed interval function.

9. Enter numerical values into the table. Make an automatic change in the color intensity of cells from the value of numbers

Standard tasks of the second CW:

1. Generate a sequence of numbers. Find the number of the maximum element

2. Generate a sequence of numbers. Find the number of the minimum element

3. Generate a sequence of numbers. Print all even elements

4. Generate a sequence of numbers. Calculate the sum of all odd items

5. Generate a sequence of numbers. Answer the question. Are all numbers positive?

6. Generate a sequence of numbers. Answer the question. Are not all numbers negative?

7. Generate a sequence of numbers. Answer the question. Are not all numbers positive?

8. Generate a sequence of text data. Answer the question. Not all wines from Italy?

9. Generate a sequence of text data. Answer the question. Is all oil supplied from Russia?

Standard tasks of the third CW:

1. Create a buyer-seller relationship in the database

2. Create a buyer-seller-supplier relationship in the database

3. Create a relationship with multiple keys in the database

4. Create a parametric query for a digit in the database

5. Create a parametric query for the production date in the database

6. Create a query in the database for a digit within the specified range

7. Take a photo on your smartphone. Save photo to Laptop using Internet as data transfer channel.

Standard scale and criteria of the results of the midterm control work assessment are given in the general part of FET of the educational program.

2.3. FULFILLMENT OF THE COMPLEX INDIVIDUAL SELF-WORK TASK

Individual complex task for the students is used for assessment of their skills and abilities acquired in the process of learning the discipline in which the course project or course paper is not stipulated.

Standard scale and criteria of assessment of the individual complex task presentation are given in the general part of FET of the educational program.

2.4. MIDTERM ASSESSMENT (FINAL CONTROL)

Admission for midterm assessment is made according to the results of continuous assessment and progress check. Preconditions for admittance are successful presentation of all laboratory works and positive integral estimation with respect to the results of continuous assessment and progress check.

2.4.1. Midterm assessment procedure without additional evaluation testing

Midterm assessment is made in the form of a test. Credit on the discipline is based on the results of the previously fulfilled by the student individual tasks on the given discipline.

Criteria for putting the final mark for the components of competences in the process of midterm assessment made in the form of test are given in the general part of FET of the educational program.

2.4.2. Midterm assessment procedure followed by evaluation testing

In definite cases (for example, in case of re-attestation of the discipline) midterm assessment in the form of the test on this discipline can be made as the card-based evaluation test. Every card includes theoretical questions(TQ) aimed at control of the acquired knowledge, practical tasks (PT) aimed at mastered abilities, and complex tasks (CT) aimed at control of the acquired skills of all declared competencies.

The card is formed so that the included questions and practical tasks could estimate the level of maturity of **all** declared competences.

2.4.2.1. Standard questions and tasks the discipline testing
Standard questions for the acquired knowledge control:
1. What is a computer virus?
2. What files do macro viruses infect?
3. Units of data presentation
4. Data units
5. Data storage units
6. Tools for creating graphic images in a word processor
7. Tools for creating graphic images in spreadsheets
8. Stages of creating tables and inter-table links
9. Types of database queries
10. Absolute addressing in spreadsheets

11. Relative addressing in spreadsheets
12. Tools for automating data processing in a word processor
13. Tools for automating data entry in spreadsheets
14. Styles in a word processor
15. Logical loop operator

Standard questions and practical tasks for the mastered abilities control:

1. Fill the table of the table processor with the proposed digital data and make calculations using the table processor

2. Print to the program operation log all numbers from the array, the square of which exceeds 7, but less than 50

3. Calculate the product of all positive numbers less than 20

4. Sum up the squares until the sum exceeds 40. Display on the screen on which this happened by the count

5. Show the chart of the analytically presented function in the specified interval of its change

6. Show a chart of the analytically presented function in a previously unknown interval of its change

7. Find out what the count in the array is the number 3

8. Find the sum and number of all even positive elements

9. Find the maximum element in an array

10. Tell and explain the algorithm of user actions when navigating across disks, when creating folders, moving and copying folders and documents, renaming objects

Standard complex tasks for the acquired skills control:

1. Plot the proposed function using spreadsheets

2. Implement an algorithm that can be used to calculate the value of the proposed function.

3. Implement an algorithm that allows you to find the value of the maximum modulo element in the proposed sequence

2.4.2.2. Scales of test assessment of educational achievements

Evaluation of discipline achievements in the form of the maturity level of the components *to know, to be able, to master* of the declared competencies is made according to the four-point assessment scale.

Standard scale and criteria of estimating educational achievements in the process of testing for the components *to know, to be able, to master* are given in the general part of FET of the educational program.

3. ASSESSMENT CRITERIA FOR COMPONENTS AND COMPETENCES LEVEL OF MATURITY

3.1. ASSESSMENT OF COMPETENCES COMPONENTS LEVEL OF MATURITY

While estimating the level of competences maturity by selective control in the process of testing it is considered that *the mark obtained for the components of the examined competence is combined with the corresponding component of all competencies formed in the frames of the given academic course.*

A general assessment of maturity level of all competencies is made by aggregation of marks obtained by the student for each component of the formed competencies taking into account the results of continuous assessment and progress check in the form of the integral mark according to the four-point scale. All control results are put into the assessment sheet by the teacher according to the results of midterm attestation.

The form of the assessment sheet and requirements for its completion are given in the general part of the FET of the educational program.

While making the final assessment of the midterm attestation in the form of test standard criteria given in the general part of the FET of the educational program are used.